RECONSTRUCTION IN THE SECONDARY SCHOOL

BY

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PREFACE

THIS book was planned and half of it was written during 1938-1939, when the results of the use of my Tests of Ability for Secondary Courses were beginning to accumulate, and when, too, the appointed day for the raising of the school-leaving age to fifteen having been fixed in Scotland for September 1st, 1939, the problems connected therewith were engaging my attention.

It was completed in 1942 and was in the publishers' hands before the numerous reports on Educational Reconstruction began to appear. Indeed, the Government's White Paper and the Reports of the Norwood Committee and of the Educational Institute of Scotland (*The Scottish School*) were published while the book was passing through the proof stages.

This, I trust, will explain the absence of references to these and to other contemporary documents. If the views expressed here appear similar to those of others, it is only because many different minds have reached the same conclusions in spite of their different lines of approach. Nevertheless, I have reason to believe that the reader will find in these pages a severely practical discussion which translates the general principles now finding universal acceptance into the detailed procedures of the classroom and the school. These should be of interest to all —parents, teachers, employers and officials—who will eventually be responsible for carrying out together the reconstruction of secondary education, and without whose complete co-operation progress will be impossible.

I take this opportunity of expressing my indebtedness to those members of my profession who, whether as assistants or as heads of schools, have provided me with so much valuable data. In particular I owe much to the staff of the Education Officer of the City of Birmingham, and to the staff of Kirkcaldy High School. The Director of the Scottish Council for Research in Education and his secretarial assistant have given me indispensable help with the proofs.

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CHAPTER I

INTRODUCTION: A 'NEW ORDER' IN EDUCATION

MANY a philosopher, seeking for Truth, must have longed to escape from the busy stream of everyday life into a quiet backwater—a library or a monastery—where reflection and contemplation might produce their precious fruits unimpaired by the strife and clamour of the world of action. And, doubtless, many a schoolmaster must have sighed for that cloistered seclusion in which " this our life, exempt from public haunt, finds tongues in trees, books in the running brooks, sermons in stones, and good in everything " [1]—the ideal milieu for his professional labours.

But such withdrawal can be carried too far, and the educationist, for one, cannot afford to lose touch with practical affairs. He must take account of the problems of industry and commerce, of politics, economics and civics, for without reference to these his major activities become meaningless; and, as the world into which his pupils are presently to be absorbed is in a constant state of flux, he can no longer depend for his guiding principles upon custom and tradition.

It is true that the problems of educating young people in the present century are fundamentally similar to those of previous centuries, but they are vastly different in detail and in setting; and while the recorded experience of the schoolmasters of bygone days has its place in our own philosophy of education, enabling us to see our problems in truer perspective, it has little direct contribution to make to their solution. We may sympathetically approve the aims and the methods of Vittorino da Feltre and other Humanist educators; we may gain enlightenment and even inspiration from the writings of Quintilian, Montaigne, Milton, Locke and others; we may condemn the practices so vividly caricatured in Mr. Squeers's notorious establishment at Dotheboys Hall, or typified in Fagin's school for pickpockets where vocational selection and vocational training were both effectively applied. Yet, as the educators of today, we have also to recognise that the situations with which we have to deal were unknown to our predecessors and that the procedures which were successfully used by them have ceased to be of the same value to us.

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[1] *As You Like It,* Act II, Sc. 1.

We must not lightly discard what is valuable in our educational heritage; nevertheless, in dealing with current problems a new outlook is required and new methods must be sought, devised and applied. It is certain that the age of compulsory attendance at school will eventually be raised and that the secondary school will then have to deal for a longer period with young people for whom many of the present procedures of education were never intended and for whom they have already been shown to be unsuitable.

New aims, new procedures, new methods—what form will these take? Shall we be able to discard the static formalism of our classroom activities and make 'schooling' a living, dynamic force, as diverse in its forms and modes of expression as are the individuals for whom it is provided? Shall we, in our day, find "tongues in trees" and "books in the running brooks," or shall we be for ever tied to the printed page and to the written examination? Shall we continue to evaluate the educative process by certificates and by vocational success, or shall we seek for a greater enrichment of personality and a higher ideal of social duty and of Christian service?

These are vital questions, to which *ideal* answers are being shaped in many minds. But there is a wide gulf between the imagining of the idealist and the practical action into which it has to be transformed, and, before any progress can be made, these two aspects must be effectively co-ordinated. The present work is an attempt to do this for secondary education, to define some of its problems and to suggest the directions in which, in the light of our present knowledge, we may most profitably seek their solution. These suggestions may not be generally acceptable, but, even if they are, it must be recognised that the active co-operation of all concerned—Education Committees, employers, parents, teachers—is required to make them effective.

A school, any school, may be defined as a group or an association of individuals, old or young, experienced or inexperienced, whose primary purpose is the active and systematic participation in educative activities which are suitable to their abilities and interests. The members of this group may never become fully aware of the ultimate effects of their activity upon their own physical, mental or moral qualities and attributes; but they must be aware of, as well as keenly interested in, the immediate purpose of this activity, whether it be to make a basket (thereby developing and exhibiting their manipulative skill), to solve a quadratic equation (thereby demonstrating their mathematical ability and knowledge) or to act in a play (thus expressing their natural or cultivated powers of observation and mimicry). If they are not interested, no educative activity can occur, and the group, whatever else it may be, is not a school. This is a basic fact of some importance at all ages, but especially at fourteen, fifteen and sixteen.

Moreover, in addition to the consciousness of purpose, there should also be the realisation of membership of, or partnership in, the joint activities of the group. Such realisation is difficult when the group becomes too large, but it can be fostered and developed by the enthusiasm of a director, an organiser, a leader, a teacher, someone who is aware of the purposes to be served by the group activities and whose duty is to direct them towards the desired goals. In these joint activities the attitude of the individual member to the activities of the other members and to the leader or teacher is as important as are the mainsprings of his own activity.

Sometimes the rôle of the pupils, and especially of older ones, may become too passive or too receptive, but it can be, and with younger children ought always to be, an active, constructive one, to which books and apparatus, tools and materials, workrooms, laboratories, playing-fields and gardens all contribute. It is difficult to conceive of creative activity without equipment and apparatus, nevertheless the basic relationship between a teacher and a pupil is not in itself dependent upon these adjuncts, nor even upon buildings; we remember that Jesus, Socrates and others have taught by the wayside or wherever their disciples gathered together. Indeed, this thought suggests that our ideal school should never be confined to one place or to one group of buildings, but should be capable of transference from town to country, from field to forest, from workshop to recreation-room, according to need. A school can remain an organised community for social and other group influences even when its members are variously distributed for instruction or for other purposes. This is another basic fact which must be borne in mind in connection with the specialised instruction of young people at fifteen or sixteen.

Again, the distinctive character associated with any established school does not spring from the venerable, ivy-clad buildings which it may have inherited, nor from the beauty of their adornment, nor from the excellence of their equipment, but from the mental and spiritual influences which have been exerted upon each member by the collective activities of the groups of individuals who have shared them with him, and especially of the leaders and teachers who directed those activities. Arnold's influence at Rugby, like that of many another teacher, lived on in the minds and in the lives of those who experienced it.

It is necessary to emphasise this interaction between the individuals of a group, this impact of mind upon mind and of spirit upon spirit, because the administrative side of education, in its preoccupation with buildings, rooms, equipment, books, classes, attendances, promotions, examinations, marks and results, seems to undervalue this supremely important aspect. No 'New Order' in education will be any better than the 'Old Order' if it shows a similar preoccupation; and the raising of the school-leaving age to fifteen or sixteen will not achieve the results we desire unless we constantly remember this further basic fact.

Many head masters have found it difficult to give adequate time and thought to the fullest development of the spiritual influences of the school because they have been too much absorbed in the administrative details demanded by the complexities of our modern school systems. For them, the direct and continuous personal association with the more mature pupils has become impossible, the essential study of each separate member of a group, which is antecedent to every really educative group enterprise, has been subordinated to the compilation of statistics about their collective activities, while the close personal relationship of master and disciple has been replaced, to a considerable extent, by typewritten notices and printed assignments. Even the statistics are concerned more with examinations than with the welfare of individual pupils.

The undue importance attaching to examinations has, perhaps, been unavoidable, especially as they seem to provide some objective measure of the efficiency of a school's activities. But the number of certificates gained by the members of a school group is, in itself, a quite meaningless statistic; it is a number which requires to be interpreted in relation to the number of pupils preparing for examination, their ability to learn, their desire to learn, the time devoted by them to examination work and to other work, their home circumstances, their opportunities for independent study, as well as to that complicated mixture of incentives, aims, encouragements, trials and disappointments which is characteristic of the corporate life of a group. Even then, the statistic gives no information about the attitudes of mind, the modes of thought, the ideals of conduct, the conceptions of duty and all those intangible, yet extremely valuable, influences which come from full and satisfying activities in a group where sympathy and effective co-operation replace drive and compulsion.

To secure sympathy and co-operation we require a group which is neither too large (for then the individual is lost), nor too heterogeneous (for then the diverse individual characteristics militate against harmonious co-operation). Large groups require to be divided into smaller, more homogeneous groups, and it may be difficult to decide how this may best be done. Should school groups preferably consist of those who are equal in intellect, in attainment or in any other attribute? If not, how diverse should they be in regard to the age, abilities, interest, talents and temperaments of their members? Should a school, by including all types and classes of society, represent the external world in miniature, or should it be selective, concerning itself only with persons from one particular section of that society? In which of these will there be secured the best and most fruitful interactions among the members?

An attempt to answer these questions will be found in subsequent chapters; but if we seek for guidance in the current practices of today, we find a strange and bewildering diversity of opinion. The Public Schools, the Grammar Schools, the Municipal and County Secondary Schools, the Commercial, Technical and Trade Schools, the Central and Senior Schools, with their many variants, express views which it is extremely hard to reconcile. There do not seem to be any universally accepted aims and methods; on the contrary, different needs have been satisfied in different ways by people who have shaped and moulded scholastic endeavour to their own ideas through many decades of social development and change.

This moulding process can never cease; any association of persons worthy of being called a 'school' is a *living* thing, depending for its vitality upon the inspiration it both creates for, and draws from, the community which it serves; and as the needs of that community change, so must the aims and methods of the school.

This is especially true of the secondary school, which, during the last twenty-five years, as an organising influence in the education of the adolescent, has considerably expanded its services to the community. This process must continue with greater speed and with a more exact regard for individual needs. The secondary school of tomorrow must become 'universal'; instead of limiting its courses of instruction to the highly formal and abstract treatment of those subjects which, following tradition, it was inclined to consider necessary for *all* educated men and women, it must extend the range of its pursuits, even more than it is doing at present, to include the active interests of the less intellectually gifted members of the community. Only so can it become a source from which *every* pupil can draw inspiration and guidance as his personality matures.

This is no light undertaking, whether a school be large or small; every school will have its own peculiar problems according to the nature of the individuals who compose it. In dealing with these, the relationship between the master and the disciple, between the teacher and the pupil, which is, first and foremost, a personal link between two human beings, must be maintained on as intimate and fruitful a plane as possible, even when it becomes profoundly modified in the group activities by the composition of the group and by the relations existing between its members. Hence one of our practical problems is to determine how far the organised activities of a group should be related to the needs of the individual *per se,* or to his needs as a member of the group, for these are not always effectively served by the same procedure. To what extent should the emphasis be placed upon *individual* learning, upon *individual* skill or upon *group* influences such as are derived from co-operative activities and from the subordination of individual interests to the effective promotion of a communal enterprise?

If we were concerned only with such limited aims as the imparting of information or the acquisition of a skill, we might be inclined to stress the value of individual tuition and seek for an organisation which would promote the most rapid individual progress. But our aims are much broader; while we do want effective and rapid learning, we want other things as well. The effects of grouping are far-reaching, but they can properly be assessed only in terms of their influence on the individual. Modern research has disclosed the nature and the extent of individual differences in learning capacity. The clearer recognition of these differences compels us to examine our methods of instruction—both group and individual—with keener criticism, recognising throughout that the personal links between the teacher and his pupils become transformed by the relations existing between the members of the group and each other. The simple bi-polar, teacher-pupil relationship of private tutoring becomes the complex many-sided relationship of a social group, modified and conditioned by large differences in the learning capacity of its members.

Explicit reference to this aspect of 'group' education will not be made again. It will be assumed that subsequent suggestions for the better education of the individual pupil, whether alone or with others, imply a recognition of these basic facts. Consequently, the main corner-stone of our new edifice will be the study, by the most exact methods available, of the talents and temperaments of the individual members of the school groups with which we have to deal.

For those who work in secondary schools the problems are twofold, being concerned, first, with each pupil's fitness to attempt a selected course of advanced instruction, and, second, with the *results of that attempt* in so far as they affect his subsequent choice of a career and his ability to undertake the preparation necessary for it. The usual procedure in ability measurement has been to study the record of the candidate's achievements and to draw from it inferences as to his probable efficiency in dealing with a new problem or in acquiring a new skill. The method is sound enough, if properly used, but it could often be improved if we knew the significance of the individual's failures and were not limited to information about *some* of his successes. Even in regard to these we have been mainly influenced by the fact of success instead of examining the processes by which it was achieved, and especially the abilities and attainments underlying them.

Now, the abilities which are necessary for success in school activities, though as yet not completely understood by those most concerned with them, are undoubtedly closely related to those which promote success in certain types of vocation. Whenever they are not, we ought to know how and why they are different, and this requires a more exact analysis of the growth or maturing of abilities of all kinds than is customarily undertaken.[1] Because of this intimate connection between the abilities revealed in school and the abilities required in occupations, there should be the most complete co-ordination of the aims and methods of education at the two main stages of adolescent development.

At the first stage, from eleven to sixteen, the schoolmaster's aim should be to ascertain how individual differences in ability affect such matters as the classification of pupils, the choice of appropriate media of instruction, the degree of difficulty or complexity of the tasks to be attempted, the best methods of instruction, the special methods to overcome individual difficulties, and the like. It will generally be found that the best possible answers for the pupils studied separately are also the best for the group and for the school. Moreover, a successful solution at this point is not only an important step towards the simplification of the later problem of the choice of a career, but also yields valuable results in the subsequent social orientation and adjustment of the individual. In short, a misfit at this stage is very likely to result in a misfit later.

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[1] This receives attention in Chapters II and III.

At the second stage from sixteen onwards, we are concerned with the problems of transition from youth to manhood. The adolescent has to be absorbed into society as a working member, and the process of adjustment may be difficult and prolonged. Such natural aptitude as the individual possesses for the work he now undertakes must inevitably affect his performance in it and, therefore, must determine the extent to which the quality of his work pleases his instructors, his supervisors or his employers. Moreover, the attitude which he adopts on entering employment is also important, and the school may have a great deal to do with developing in him a sound attitude, through which his work will be competently done to the satisfaction of both himself and his employer.

The secondary school cannot afford to remain indifferent to the problems encountered at this stage by those who would employ its former pupils. Whenever it is necessary to estimate the extent to which ability and character influence the success of an individual in any particular task or group of tasks, it becomes increasingly difficult, as he gets older, to distinguish between the effects of natural aptitude and the effects of acquired experience, especially when these become affected, about sixteen, by temperamental disturbances or by hesitancy and temporary loss of confidence. Yet a separation must always be attempted if a decision is to be reached The realisation of this leads to the question whether or not it will be profitable to refer back to the earlier stages, where the differences might be more easily observed, and where, if the school knew what was required of it, there might also be a more accurate assessment of the youth's characteristic qualities during the processes of recording.

Recent research suggests that the inborn qualities upon which the development of some abilities undoubtedly depends are best observed and measured at the earlier stages of growth, whereas the abilities which express acquired knowledge and skill in high degree are more accurately measured at later stages. It should be noted also, that, for some purposes, the detailed study of an individual is likely to be more fruitful *after* certain definite characteristics have developed. A youth of seventeen or eighteen often possesses a characteristic personality which is attractive to a prospective employer, his inborn qualities having matured into recognisable and more or less permanent traits. By contrast, a boy of fourteen or fifteen presents a relatively immature and undeveloped personality, for which the constraint of his home and school environment, as well as his limited experience, is often responsible. But as the boy approaches the adult stage his personality, despite these restraints, becomes more and more representative of his real self, and, therefore, if properly observed, ought to provide a much truer indication of what he will be when fully grown than any opinion formed earlier could have done. In these respects the later study of ability for occupation would appear to be easier than the earlier study of ability for education, since the field of opportunity has become less extensive and problems of choice have become more specific.

Yet, both studies are alike in that they are equally inspired by the belief that the talents a man has inherited from his parents and ancestors, the education and training he has received during his early years, and the traits of temperament and character he has developed during childhood and adolescence, all contribute in various complex ways to his achievements. If we can discover soon enough how an individual's talents and temperament are growing, we ought to be able to decide in advance what will be the most suitable media for their further development and then so to direct his choice of studies that, in due course, we may help him to choose a congenial occupation. This is not the end of the story, since his education for life and for citizenship is by no means complete, but it may mark the extent to which the secondary school can, in ordinary circumstances, take a leading part in shaping and moulding the final product. Moreover, it emphasises the fact that an adequate study of the problems of the secondary school of today must take us a considerable distance from its walls; and that we have to consider, not only what the child is when he comes to us, but also what is to become of him when he leaves us. Whatever we succeed in doing for him or with him, our contribution, good or bad, remains one of the principal formative influences of this stage of his development.

Hence, we cannot ignore the social and economic changes taking place today, for they bring us into more direct contact with the occupational problems of our young people. Hitherto, the large majority of secondary-school pupils have postponed the actual *choosing* of a career, though not the *thought* of it, until they have come to the end of their school studies. For the few, the more highly gifted, this may not create any serious difficulty, either of choice or of further preparation, but for the many it is certain that this postponement makes the choice more difficult than it should be, especially when the course of study previously followed has been inappropriate for them. It will be part of our task to consider how this defect may be remedied. Too sharp a distinction between the 'education' given in the school and the 'training' given in the occupation creates in the adolescent an attitude of mind which intensifies the difficulties confronting him. Reconciliation of the aims and methods of these two stages can best be achieved during adolescence, by interpreting the aims of both in a more liberal manner and by allowing the methods of each to influence the other.[1]

It will be assumed that the reader is familiar with the progress that has been made in the general technique of ability measurement during the last twenty-five years. Nevertheless, it seems desirable to refer briefly to one or two important principles which will be found extensively applied in the subsequent discussion. Those who require a more exhaustive treatment are referred to books which deal especially with these topics.[2]

The psychologist recognises that every mental process, be it direct perception (meaning-getting), simple recall (memory), re-combination of experience (imagination) or analysis of experience (reasoning), is accompanied by the activity of some part of the nervous system, and this activity, in itself, may produce a modification, temporary or permanent, in the functioning, if not in the structure, of that system. It matters not whether he calls the resultant *effects* 'apperception masses,' 'complexes' or simply 'ideas'; he realises that environment, acting through the receptor and effector mechanisms upon the higher centres of the nervous system, may considerably increase their power to act appropriately; so that the final flowering is not simply an expression of the innate endowment of the individual (as exhibited in the *quality* of his mental processes), but the combined expression of both endowment and environment. The difficulty is to say precisely at what point any inefficiency or inappropriateness in the behaviour of an individual arises from the defective quality of his natural endowment rather than from the limitations of his environment.

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[1] Some suggestions bearing on this question will be found in Chapters V to VIII.

[2] E.g. Vernon, *The Measurement of Abilities* (Univ. of London Press, Ltd.).

In all cases, however, the resulting effects constitute *experience*. Ability, mental or physical, is experience in action, and because every ability must be expressed in action or in thought as the prelude to action, the only way to assess the abilities of an individual is to observe the appropriateness and the efficiency of his actions and thoughts. Moreover, speed, that is quick thinking and acting in an emergency, may be an element in this efficiency. Binet showed that such judgments require (1) an analysis of the completed acts expressed in psychological terms and (2) a suitable measure of their appropriateness by reference to some agreed standards of performance in some specified kinds of activity.

It is in choosing the activities which are to be used for these test purposes that we encounter the difficult and indeed fundamental question: How far does an efficient performance in any selected activity represent a high natural endowment functioning with little or no specific training, or only a moderate endowment trained to its highest degree of effective action?

The answer is that we really do not know, though we can make quite reliable guesses when we have sufficient and appropriate data. So far as the ability of an individual to carry out any given task is concerned, the distinction does not matter, say, to an employer, whose main desire is to get efficient service. But if we propose to use the individual's performance in the test activity as a criterion for judging how efficient he will be in other, perhaps dissimilar, activities, we cannot afford to ignore it; for it is in these circumstances that a precise understanding of the components of the individual's ability will be most valuable. This is the situation we constantly encounter, whether we are dealing with the problems of the choice of a course of studies in the secondary school or with the problems of the choice of a career to follow it.

It has become common to speak of measuring the child's *intelligence* whenever we are dealing with school problems and of assessing his *special abilities* in connection with vocational ones. Yet these are two closely related aspects and they ought to be considered together; indeed, it is doubtful whether we should continue to speak of *measuring* intelligence, in spite of (or perhaps because of) all the work that has been done upon it.

E. L. Thorndike, in 1925,[1] described 'intellect' in terms of certain activities named, respectively, Construction, Arithmetic, Vocabulary and Directions, these names standing for groups of activities in which he had prepared a large number of separate tasks carefully graded in difficulty. He declared that 'intellect' is manifested in three aspects:

(*a*) the *level* of difficulty or complexity of the task accomplished;

(*b*) the *range* of knowledge or the number of tasks accomplished at each level of difficulty;

and (*c*) the *speed* at which the tasks are successfully performed.

He considered that the only way to measure intellect was to use a very large number of these graded tasks, and to observe how many could be done *at each level* in a given time, though the time factor was not, in itself, to be considered of much importance. The summation of all these C.A.V.D. elements, which were intended to cover the whole range of intellectual activity, would yield the best possible measure of the individual's 'intellect' and the most reliable basis for any prognosis regarding his probable efficiency and success in an intellectual task.

Apart from the fact that many mental tests have been based on these procedures, this threefold classification is highly suggestive to the educationist, for in the range of work attempted at the secondary stage there are, as at the primary stage, various levels of difficulty, and the higher ones lie beyond the powers of some of those who try to rise to them.[2]

This particular view of intellect as a summation of many diverse elements was not acceptable, however, to psychologists in Britain, where the influence of Spearman and, later, of Burt was considerable. These investigators thought that an individual's ability to learn was best regarded as the expression of a single operating force or power which was applied in everything the individual did, though not always to the same extent. Only when this basic ability or power was adequately measured and when certain other conditions existed could there be any sound basis for forecasting the individual's future progress and achievement.

So far as the abilities of the adolescent are concerned, this line of approach is, however, not the most profitable,[1] and at the secondary stage, in particular, a measurement of 'general intelligence' is not, in itself, sufficient.

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[1] Thorndike, *The Measurement of Intelligence* (Teachers' Coll. Pub, Columbia Univ)

[2] A further development of this will be found in Chapter VI.

Indeed, intelligence is not truly an ability, though it is often spoken of as if it were; it is rather a *description* of ways in which the activities of animals and men exhibit the invention of, or the adaptation of, means appropriate to the achievement of the ends or purposes which the actions are desired to serve. These purposes themselves become more extensive and complex as the individual's abilities develop. The *imitative* activities of an intelligent animal and of a young child are similar in that they appear comparatively unrelated and unorganised; the *intelligent* behaviour of an adult man is not only more complex, in that it embodies a great deal more of perceptual experience, but also more unified or integrated in its application and expression. It is in this respect, and in this respect only, that we can speak of the 'growth of intelligence,' or give any meaning to statements such as, that 'intelligence increases to sixteen years of age and then either does not increase any more or increases at a steadily diminishing rate to twenty-one or twenty-five, as the case may be.' What we really mean is that the actions of the individual display in a constantly increasing degree the hall-marks of intelligent, as contrasted with instinctive or with imitative, activity.

There is plenty of experimental evidence to show that an individual's *power* to apply his already developed abilities to new situations does progressively increase and that it is not necessarily expressed fully or completely in his current attainments or bodily skills. When it is not so expressed, it can be ascertained by bringing him into direct contact with new situations which require the higher powers. If he possesses these, he will rise to the occasion. But these steadily expanding powers are not just additional attainments and skills, though they must necessarily be exhibited in such attainments and skills, and it is just because this is so that the problem of measuring them presents special difficulties.

It is not enough to try to measure an individual's abilities, even if we are agreed as to what they are, by setting tasks which seem to require the prescribed skills of body or processes of mind, but these must be selected and used so as to secure their application at the requisite *levels* of difficulty and complexity. Many situations in everyday life can be dealt with at different levels of foresight and adaptability, and it is important to know at which level the individual is operating. This is, in fact, what Binet's original scale of mental tests set out to determine. Some of the tasks employed in it, such as repeating sentences and digits, comparing likenesses and differences, defining common objects and solving simple problems, were used at different stages of growth with increasing expectations as regards the quality, appropriateness and complexity of the responses. In a lost-ball problem, for example, it is not sufficient to be able to find the ball, for a persevering unintelligent person may achieve that result; the important clue to mental power is the method of search, for this indicates the level at which the problem is being apprehended and dealt with. It is highly significant that some children can acquire the knowledge or the skill required to perform simple tasks, but are unable, even after the lapse of years, to develop to the higher levels of perception or adaptation demanded by more difficult tasks.

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[1] In Chapter IV and in Appendix I evidence is given in support of a different approach to this problem.

In short, the current concept of a general ability (or intelligence) is useful at the primary stage only in so far as it represents an epitome of the individual's efficiency in doing his own thinking, in making his own adaptations and in learning through instruction to form his own 'integrations' of experience. What appear to be measures of it may be, indeed, not the manifestation of an all-embracing ability but rather summations of many separate acts of effective thinking and doing. The child's own integration of these into related wholes leads to groupings which eventually correspond to the specialised abilities needed for particular types of activity. This process of integration is effective, partly because the individual has an innate aptitude for it and partly because a systematically ordered environment helps its formation. It is our business as schoolmasters to determine the child's aptitudes by comparison with acceptable standards and to arrange the environmental influences in accordance with the needs indicated by the nature of these aptitudes. To these two tasks we may now turn.

CHAPTER II

THE CHILD AT ELEVEN PLUS. METHOD OF STUDY

"PRIMARY education should be regarded as ending about the age of 11. At that age a second stage should begin, and this stage, which for many pupils would end at 16, for some at 18 or 19, but for the majority at 14 or 15, should be envisaged as a single whole, marked by the common characteristic that its aim is to provide for the needs of children who are entering and passing through the stage of adolescence." [1]

'Eleven plus' means, literally, that a child has already passed his eleventh birthday. But the use of the qualifying word 'about' seems to indicate that the Consultative Committee of the Board of Education did not wish to fix any precise limits; and in actual practice we find that the ages of children selected for admission to a secondary school, at any place and at any time, range from 10 years 2 months (and occasionally less) to 12 years 11 months (and sometimes more). Perhaps it is considered that if the mean age of such a group approximates, say, to 11½ years, and if the standard deviation is small, these conditions sufficiently express the general meaning of 'eleven plus.' But it may be doubted whether they do, for the distribution may be skewed in one direction or the other, and the extremes may differ from the mean so much that they can scarcely be held to include children of the same or equivalent maturity, ability and attainment. Undoubtedly the age at which transfer from the primary to the secondary stage can be successfully accomplished, with all that it implies in adaptation to novel circumstances, new surroundings, different teachers and strange customs, varies from child to child. How are such variations provided for? Is the present practice good enough?

In a large English city the mean age of all children entering the secondary schools in the September of a particular year was 11 years 7 months. The ages of two-thirds of them fell between 10 years 11 months and 12 years 3 months; the ages of the remaining third were either below or above these two limits.

In a representative Scottish town at the same date the average age of pupils admitted to secondary courses was 12 years

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[1] *The Education of the Adolescent:* Report of the Consultative Committee of the Board of Education (H.M S O., 1926), p. 71.

2 months, while the limits between which the ages of two-thirds of the children fell were 11 years 8 months and 12 years 8 months respectively.

The dispersion about the mean is roughly indicated, in each case, by the difference between these two limits. It will be seen that the mean age of promotion of the Scottish children is seven months higher than that of the English children and that they are clustered more closely round the mean.

Slight variations in the mean age of promoted groups are bound to occur from year to year and from place to place, though it may be noted that in the Scottish town referred to this has remained practically constant for a period of at least five years. But the differences illustrated above are not accidental; they are associated with two quite different methods of dealing with the promotion problem. In the English city the number of ' places ' in the secondary schools is limited and most of them are filled by competitive examination; in the Scottish burgh secondary education is free and the only qualification for promotion is ability to undertake more advanced studies. Seldom is any restriction placed on numbers through lack of accommodation, of trained teachers or equipment, for these are usually determined by the local needs. On the other hand, some aspects of this question of variation in age of transfer are universal, and not all of them are under control. These are:

(1) Birth dates are not distributed throughout the year in any pattern corresponding to the fixed dates of transfer.

(2) If eleven-year-old pupils who fail to qualify for promotion at the first attempt must be given further opportunities they will usually be over 12 before being promoted.

(3) There are large differences in the abilities of children, and therefore all cannot be expected to reach the same level of attainment at the same age.

(4) Even among children of the same age and aptitude differences in attainment will arise from unforeseen and uncontrollable causes, such as illness, accident, removals and so forth. Systematic teaching at the primary stage tends to prevent such influences from becoming extreme, but it cannot eliminate their effects entirely.

(5) Difficulties of accommodation, staffing and organisation, etc.

The last is certainly not an essential disturbing factor and, it is hoped, will not be allowed in the future to interfere with the better solution of this problem. But it would seem to be quite impossible to control the other variables so that pupils may be promoted in homogeneous and sufficiently large groups at approximately the same date. At any rate, few systems now in use achieve this result. Promoted groups almost invariably contain a number of children who are 'immature' in the sense that, although they have reached the minimum level of attainment prescribed (though by what means they reach it is seldom disclosed), their mental growth is not yet sufficient to enable them to undertake successfully the more difficult problems of their new environment. It is very doubtful whether any children under eleven are really mature enough for early promotion to an organisation and a curriculum such as are found in most secondary schools today.

Maturing implies that there are times in the development of every child when he is 'ripe' for a further advance and when his progress may be helpfully stimulated by the introduction of more difficult tasks. In a minor way these occurrences are frequent during each school year, for every skilful teacher creates them by preparing the ground for the next move forward. But there are also at least two major occasions when, not only should there be an introduction to new problems, but the stimulus of a new outlook and a new ambition. It is generally agreed that one of these occasions should arise when the child is eleven or twelve; the other should be at sixteen or seventeen, when, for many, the problem of a career, already tentatively considered, is being seriously and finally examined. As already pointed out, these two events are not and never should be entirely disconnected; it is an inescapable fact that the proper choice of a secondary-school course is part of the preparation for a career and much depends upon the decisions or the aims implicit in it. Hitherto, because we did not care to guess what sort of progress would be made from eleven to sixteen, what degree of maturity the individual would reach and in what form his abilities would express themselves most efficiently later on, we have dealt with the two problems separately, and it has been almost a happy accident that they have so often been satisfactorily adjusted. Nevertheless, there are far too many instances of unco-ordinated effort, and we ought to endeavour to remedy this at the earliest possible moment. To do so we need a better technique of assessment on the one hand and a more comprehensive and unified set of aims on the other.

The information at present available about the child at eleven plus is meagre and unreliable. It may consist only of a scholastic record, summed up in a percentage mark in the main subjects of English and Arithmetic. The mark itself is a composite judgment which is sometimes influenced as much by the personal relations between the teacher and the pupil as by the absolute merit of the latter's work. Into this composite assessment go the natural abilities of the child, the earnest effort, skill, and enthusiasm of the teacher, the ambitions and exhortations of the parent, the physical strength and endurance of the child, as well as his temperament, his reliability, his docility and his suggestibility. In what proportion each of these influences has contributed to the final assessment no one knows. The mark means something—but we should know better than we do what it really does mean. Certainly few secondary school head masters find that the mark gives them all the information they require.

Again, it may consist of marks obtained in a scholastic examination (chiefly in English and Arithmetic, but sometimes in other subjects of instruction), and these may be interpreted, more or less scientifically, for each individual by comparison with the means and the distributions of the marks obtained by a much larger group examined at the same time.

Or again, it may take the form of scores obtained in mental tests, from which an inference, more or less reliable, is drawn regarding the quality of the child's general 'intelligence' or 'educable capacity' (if not in general, at least in relation to his abilities in school studies).

These additional measures may, and often do, give greater validity to decisions regarding promotion when no restrictions of accommodation exist, but it may be questioned whether they do so successfully when a limitation of places introduces the competitive element. Indeed, it has been shown by more than one investigator that 'special place' examinations frequently fail to discover the most suitable pupils for promotion, and that they reject others who would have done better at the advanced stages than those actually selected. (It may be admitted that no examination technique can be expected to be absolutely perfect, but we should always strive to find one which operates with maximum efficiency.)

It should be remembered that what we really require at eleven plus is evidence of mental maturity. Such maturity cannot be inferred from scholastic records alone, nor yet from scholastic examinations, even when these place, as many do, considerable emphasis on the 'intelligent' rather than on the 'reproductive' aspects of the child's learning. A superior child may be able to reach at 10½ to 11 a standard of attainment equal to that expected from an average child at 11½ to 12. But if he is not yet psychologically mature enough for promotion, the change to the secondary course cannot bring about that exhilarating and stimulating attack on new problems which is expected; instead, the child becomes discouraged by the difficulty of the new work and may develop a feeling of incapacity which will militate against progress for some considerable time. This immaturity may not be noticeable at once because there is usually an element of familiarity about some of the early work (being revisional), but sooner or later it will reveal itself in reduced efficiency, and the reasons are rarely understood by either parents or teachers. They are even more difficult to discover in the case of those children whose well-drilled skills and attainments carry them fairly successfully through the whole of the first year, but whose adaptability and resourcefulness are not really adequate for the more complex problems which they subsequently encounter.

Admittedly, the problem is not easy of solution. Judged by his attainments, this immature child of 10½ is ready for promotion; judged also by mental tests, the prospects of successful promotion are good. (Terman, it will be remembered, notes that the brightest children in any class are usually the youngest.) The only evidence of immaturity lies in the child's age, though, if we look carefully, we may also find it in the methods which he uses to solve his problems. This, however, implies an individual study.[1]

On the other hand, if we regard all children under 11 or 11½ as generally immature, we may handicap the few exceptional children (and they are really few) who do mature early. In such cases there is little doubt that at this stage the necessary period of apparent 'marking time,' which Nature seems to require for the successive consolidations of the processes of growth, maturing and education, is a relatively short one. Even so, the time gained at 10½ is often surrendered at 17 or 18, so that it may be doubted whether any real advantage is gained by the earlier promotion. But with the majority of children too early promotion defeats its own objects, and much of the ineffective work found in many secondary schools can be explained by the simple fact that the rate of advancement has been too rapid, in that the level of difficulty of the successive tasks attempted lies just beyond the level at which the child can operate successfully.

It may not be generally realised that the average age of commencing the usual academic secondary course has been appreciably reduced in the last thirty years. In a typical Scottish secondary school the records show that in 1909 the average age of the first-year group was 13 years 9 months; in 1919 it was 12 years 9 months; but in 1929 it was 12 years exactly. This is a noteworthy fact, for it means that the children now admitted to the secondary school have neither the social experience nor the physiological maturity of their predecessors; it also means that, in spite of the adjustments that must have taken place in the organisation of the programmes of work (to suit these more immature minds), many of these children cannot be expected to be mature enough for the work which they are required to attempt. It may be claimed that in school subjects the attainments, on admission, of these younger children are, today, equal to those of the older children of twenty years ago. Perhaps they are in many respects, but teachers of languages complain of the lack of knowledge of English grammar, and it is in language studies more than in others that serious difficulties occur. There is little doubt that this is partly the result of social inexperience and general immaturity reflected in a less efficient grasp of language usage.

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[1] But why not? The time devoted to it will be amply repaid.

It is, then, illusory to imagine that primary-school records and tests of attainment can, in themselves, provide a true indication of a child's fitness to commence secondary courses, even those of the kind we have hitherto mainly provided. And the remedy for *our* failure to understand the problem does not lie, as is sometimes suggested, in more intensive teaching, in more individual attention or in greater pressure. In many schools the teaching is intensive enough and the pressure could be relaxed with benefit to many. The effective remedies are clearly the twofold ones already indicated: first, the procedure controlling admission to the secondary school must be radically overhauled; and second, the schools themselves, recognising the relative immaturity of many of their entrants, must reshape their curricula and modify their expectations.

Maturity is, as we have seen, the combined result of physical growth, of developing innate aptitudes, of social experience and of acquired knowledge. The first, being influenced by age, heredity and nutrition, is not under direct control, though it can be partially safeguarded by fixing the age of transfer sufficiently high and by seeing that the health services at the primary stage are adequate. The second, though not wholly independent of educational influences, is yet so much a matter of natural endowment that we can only watch for and note its various manifestations. Social experience comes from the home and family environment, and so cannot be controlled so easily or so exactly as can the knowledge and skill acquired through direct instruction in school. The last is definitely affected by the length of school life and therefore, so long as the age of entry to school is uniform, by the child's age. The total effect of all these influences may be summed up in the word 'experience,' if by this we mean those skills and attainments which are sufficiently full and accurate to be applied effectively to the new situations of the secondary stage. To say what this experience should include, how it should express itself and by what means we can discover whether or not the candidate for promotion possesses it, is part of the larger problem before us.

Before discussing it in detail, however, the complications caused by an inadequate provision for secondary education must be pointed out. Whenever the number of available places is limited, the controlling examination becomes a highly selective one and the standard of attainment required for acceptance tends to rise. This in turn produces greater pressure on those who seek to gain admission, with results that have, from time to time, been publicly deplored. The final result is, however, more flattering to the system than it deserves, for the accepted ones are usually (though, as noted by some investigators, not invariably) those with the best natural abilities and the well-organised experience needed in the examinations. Highly refined selection creates an 'academic' secondary school which is not representative of the population as a whole, and the courses of study which the children in such schools are able to undertake are not, properly regarded, normal or appropriate for each and every pupil. Consequently, whenever these schools open their doors, as they are being asked to do, to less highly selected groups of children, troubles and difficulties will inevitably arise. These difficulties may not necessarily be inherent in the existing curricula of the secondary school; they may be created rather by over-logical, ill-adapted or too rapidly developed methods of presentation, and so could be reduced by better teaching and organisation rather than by changes in the subjects taught. Nevertheless, many of them do arise from unsuitable subject-matter as well as from the attempt to apply to immature and less capable minds the same methods of teaching and the same standards of achievement as have been successful with mature and naturally able ones.

In contrast with difficulties of this kind we find, in those parts of the country where secondary education is entirely free, that the absence of the competitive element simplifies the problem considerably. It does not remove all the difficulties; there still remains the supremely important task of determining which children are suitable for further education and in which type of course they can be enrolled with the best chance of success. Usually, the admission or qualifying examination is not exacting, and the 'benefit of the doubt' is given whenever possible, especially when questions of accommodation or staffing do not arise. Nevertheless, the consequences have not been altogether desirable. Large numbers of children have taken courses which they should never have attempted, and the 'wastage,' as indicated by unfinished courses, has been very great. This implies, of course, that the procedure governing the provision and administration of alternative courses of study was not completely satisfactory, but this is not the only disturbing influence.

It is a striking fact that after twenty years of free secondary education, during which time the opportunity for a full secondary course has been given to all except those who were mentally unfit, only a small proportion of those who embarked upon it can be said to have really derived benefit in the way intended. This does not prove that free secondary education is a mistake, for similar wastage can be found in fee-paying schools. Nor is the economic factor of predominating importance, though it may be admitted that many of the parents who were anxious to have their children begin an 'academic' type of secondary course at the age of 11 or 12 have, as soon as they have become 14 or 15, thought more of their possible earnings and have taken them from school before completing even such a comparatively short course as one of three years. The temptation to leave school too early should be removed or substantially reduced by the provision where necessary of grants-in-aid or by other means. But it should also be recognised that in the family discussions there are frequently important considerations other than economic ones. The 'worthwhileness' of keeping the child longer at school is examined in regard to qualifications for a better post, and especially in relation to the progress the child is thought to be making. And the child's 'liking' for school is conditioned partly by his progress and partly by the nature of the environment in which he finds himself. The first pupils to leave are invariably from those who find school life a toil and a burden; the last to leave without completing a course are frequently very capable pupils who think the opportunity of a certain job at that moment better than the uncertain prospects of one later on. It is, therefore, quite clear that, even where secondary education in all its forms is free, we have yet a great deal to do before we can say that our courses of study and our methods of helping and guiding pupils and parents in matters of education are either well-conceived or well-conducted. It can safely be asserted that the proportion of the child population of any town or district that can benefit in any real sense from a linguistic and literary curriculum is seldom more than 10 per cent.; the major problem of the school of tomorrow is therefore to provide adequately for the remaining 90 per cent.

It will scarcely be disputed that the ideal in a democratic community is the establishment of a system of schools in which a child can receive as good a preparation as possible for his subsequent life as an adult, as a parent and as a citizen. In what circumstances that life is eventually to be lived will be determined, not so much by the economic resources or by the personal self-sacrifices of his parents, as by his own aptitudes and traits of temperament and character combined with the use he makes of his opportunities. Accordingly, any educational handicaps caused by limited family incomes should be removed by making education and allied services completely free and by providing such additional assistance in the matter of food, clothing and travelling expenses as may be considered necessary. Such assistance will not enable a child entirely to overcome the retarding influences of a defective home environment, but it will at least help to reduce them in number and in strength. Moreover, if we hope to ensure that the child's social education is as well cared for as his intellectual and vocational education, we shall have to change considerably our present notions of a school day extending from nine o'clock to four o'clock, with homework sufficient to keep the child occupied for a further two or three hours. We shall have to make our secondary schools centres of social life,[1] but this will not be possible so long as they are occupied by other organisations during the remaining hours of the day and evening. (The school should certainly be a centre of community life, but it should be primarily a youth centre and only secondarily, if at all, any other kind of centre.)

Having stated the general point of view which should govern our approach to these problems, some practical details of administration may now be considered. We have said that no child should be prevented, by necessitous circumstances or otherwise, from obtaining such an advanced education as his talents and temperament would entitle him to expect and as the community would deem desirable. We have indicated that

[1] See p. 136.

better measures of aptitude and attainment than those at present employed must be developed and applied, and these will receive detailed attention in the next chapter. But the vexed question remains—who is to decide how and in what form of organisation the advanced education of any particular child is to be provided? Should the final decision rest with the parent or with an official, head master or director of education, to whom this duty has been delegated by the community? No doubt the Local Education Authority must decide the general policies governing its provision of buildings, equipment and staff, and the administrative officers must direct the selective procedures, but the one determines the other. The problem is not the same when alternative courses are provided in different schools as it is when they are all within the same school; for the danger in the former case is that selection consists of successive 'creamings,' with the result that the different schools come to regard themselves as different in status as well as in kind. But these points will receive detailed attention later.

Present procedures are, however, seriously defective, in that the parent's support is not sufficiently invited or obtained for the effective carrying out of those educational arrangements which are in the child's best interests. In some districts when the time arrives for transfer to a secondary course the child takes home a printed form giving details of the alternatives available, and the parent is invited to express a preference. The head teacher of the primary school enters this choice on the promotion schedules along with his own opinion, but it is not considered essential that the parent and the teacher should discuss the matter, though some head teachers do invite parents to call for this purpose, and some parents without invitation visit the school for information. But whether the parent's choice and the head master's opinion agree or differ does not seem to matter when the schedules reach the administrative offices where the decisions are made, for these often seem to depend largely, if not entirely, upon whether or not the child has obtained certain 'marks' or 'scores' in the prescribed tests of aptitude or attainment. Once the administrative officer has decided what these pass marks are to be, the subsequent decisions entered on the promotion schedules might just as well be carried out by a junior clerk with a rubber stamp (as indeed they often appear to be) for all the attention that seems to be paid to the desires of the parent or to the opinions of the primary-school head teacher. Should the latter fail to intimate precisely to the child and the parent that the official decision differs from the parent's expressed wish, the resulting disappointment and even resentment are only intensified when the matter has finally to be explained by the head of the receiving school. Attempts to obtain 'transfers' from one course to another persist term after term unless the parent is convinced that the arrangement actually made is in the child's best interests.

The idea that head masters of schools or administrative officials know, or can know, what is best for a child is not one which parents, as yet, readily accept. Tradition is against it. Secondary head masters have not hitherto favoured differentiation (or early specialisation as they have called it), and their general attitude, especially in fee-paying schools, has been to allow, within limits, anyone to try any course or subject desired. Consequently, parents of children attending the free secondary schools have found it difficult to understand why an unrestricted choice should be denied to them or why the results of a single examination should be used to settle such very important issues. Clearly the first constructive action is to get the parents sufficiently interested and well informed for effective co-operation.

This is not properly the task of the head master, either of the primary or of the secondary school, though for want of other organisation they may, separately or together, be required to undertake it. Consultations between schoolmasters and parents are certainly desirable, but the head master has insufficient time to discuss each problem fully even when he possesses, as he rarely does yet, all the essential knowledge. The head master of the primary school, representing the teachers who have taught the child, can deal with the child's past achievements; the head master of the secondary school can explain future possibilities; but neither has sufficient direct personal contact with the child and the parent to find the best solution of his problem. Other necessary information, such as evidence of aptitudes, estimates of temperament and character, details of ambitions, interests and hobbies, can only be obtained by special means, which do not properly form part of the duties of any teacher or head master—at least, at the primary stage.

It may perhaps be well to emphasise that the problem of the individual child at eleven plus should not be regarded as consisting simply in saying whether he is to be enrolled in one particular school or be directed to one particular course, simple or difficult as these decisions may be. The secondary schools of tomorrow should not be looked upon as places where ready-made courses, precisely labelled as literary, linguistic, scientific, practical, vocational or the like, are provided for groups of children previously examined, sorted and docketed to correspond with these predetermined sets of activities. In differentiating between the aptitudes of individuals and in providing media for their appropriate development, distinctions of some kind will, indeed, be necessary; but we must take care that no hard-and-fast boundaries are set to them and that there is sufficient flexibility in the organisation to provide for those who do not fit precisely into any formal scheme of classification.

Nor should a secondary school of any type try to simplify, or to escape from, its essential task of securing adaptability by adopting a 'take it or leave it' attitude, saying in effect to parents and children: "This is what this school offers you; it may not suit you, but we can't help that." On the contrary, it is suggested that the duty of every secondary head master, supported by the governing bodies, is to make adequate provision for every child enrolled in it. He cannot do this unless he fully understands each child's needs (with, of course, adequate equipment to provide for them) and also secures the full co-operation and approval of the parents.

Accordingly, the most suitable method of arranging transfers from the primary to the secondary stage or from one school to another seems likely to be through the medium of a specially organised Educational Advice Bureau. In some localities where the number of children to be considered is small or where only one secondary centre exists, this may, for convenience, be set up in connection with the secondary centre itself; but in larger areas it might advantageously be located in one or more convenient buildings not attached to, or specially associated with, any particular school.

The purpose of the bureau would be to offer information and advice on educational problems to all parents and children. In some areas such centres already exist for advising on vocational questions, and their extension to educational problems would eventually ensure their best use for *all* cognate matters, especially when it is more and more realised that the problems of eleven plus and of sixteen plus are related. Some little time before the child reaches the appropriate promotion date, the parent should be invited to visit the bureau to discuss the child's future. Information regarding the educational facilities available, the aims and purposes underlying each particular type of provision, the connection between education and future happiness and vocational efficiency, the principles and methods governing the choice of courses of instruction (especially when the duration of such courses is not determined by the family income), should be provided in suitable form—leaflet, pamphlet, poster and so forth. The aim of the advisers should be to see that the parent fully understands what is proposed for the child as the result of special study and examination by trained persons, and when this happens to be contrary to the parent's or child's wishes, to try to reconcile these different points of view and thus secure the parent's consent to an appropriate solution. The parent ought to feel that he (or she) can, if he desires, contribute to the better solution of the problem, and may do so by giving information which the advisers may consider useful. In some cases this can be collected by asking the parent to fill up a questionnaire, in others by the adviser noting the answers to oral questions.

More than one interview may be necessary, the first to state the problem to the parents and to give information, others to receive the results of their reflections or to discuss the course recommended. In many straightforward cases, doubtless, the parents will be content to leave the matter entirely to the experts, so that most time will be required for those which are difficult because the child's aptitudes and attainments do not justify immediate acceptance of the parent's wishes, and the alternatives have to be thoroughly explored.

All these interviews need not be carried out by an adviser acting alone, though probably the first one (for information) will be most effectively dealt with by one official. The interview at which decisions are made might usefully take place at a 'conference' at which the heads of the primary school and of the secondary schools concerned in the child's future would be present. But these are minor details; the main point is to secure not only the parent's approval for the action proposed, but his firm intention to co-operate to the fullest extent. If the school age is raised to sixteen, the attitude of many parents to the child's secondary course is bound to be different from what it has been in the past when the leaving age of fourteen dominated the thoughts of both parent and child.[1] Under the present system many parents and children do not begin to understand what the school is trying to do for them until the leaving date is already prominent in their consciousness, and their apparent indifference to regularity of attendance, to systematic work and to all those aspects which are the foundation of good progress, would in time be much reduced if they could realise sooner and more completely how important a part education will play in the child's future life.

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[1] This point is taken up again on page 86

Before and during these discussions active steps will be taken to collect all the information needed by the advisers in formulating their advice. A good deal of it could come from the primary school in the form of the child's cumulative record, which may or may not include scores in standardised tests of attainment. But these records should not normally include the results of mental tests or of special aptitude tests if arrangements can be satisfactorily made for obtaining this information at the bureau itself. The objections to the use of mental tests in the primary schools are principally that the results are not reliable enough for use in difficult cases and that it is not desirable for such results to be discussed, uninformedly, by parents and teachers. Unless teachers have taken special courses in mental testing they are not likely to be qualified to read meaning into the results, even if they are competent to administer group tests.

All special tests of aptitude should be given by the trained staff of the bureau; but whether the results should be communicated to parents other than in the form of statements regarding the suitability or unsuitability of specified choices will depend upon the circumstances of the case. In some instances it may be helpful to disclose them. But the practice of expressing a child's ability in terms of an I.Q. should be discontinued. The I.Q. has been a very useful concept, but the time has come to develop a better one.[1]

In regard to the child's physical condition, here again information is best provided by expert staff, and in this connection there seems to be no good reason why the medical and dental services already administered by the Education Authority should not be co-ordinated with the educational and vocational advice services.

The staffing of such services, as well as the provision of accommodation and equipment, may seem to involve considerable additional expenditure by a Local Authority. One whole-time principal organiser and adviser will be necessary in all large areas; the number of assistant advisers and examiners will obviously vary with the work to be done. These, it is suggested, should be teachers seconded from the school services for one or two years as a means of (*a*) introducing them to other important aspects of the whole educational process and giving them an insight into the problems of education from a different angle,

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[1] Cf p. 57.

(*b*) providing them with a change of occupation within the profession and so reducing the narrowing tendencies of a limited field of interest. They might prepare themselves for the work by special short courses at Training Colleges or elsewhere, and would be under the supervision of the principal organiser. Experience in this work might also be considered, in addition to teaching skill, a recommendation for promotion to headships.

In all except the larger centres of population the work of examining children and advising parents will not occupy a full school year, and it is suggested that the remaining months might be devoted to the problems of those who are about to leave the secondary schools. Just as advice was needed regarding the first choice of a course of studies, so now help will be required in looking for the right kind of employment. It should be possible for parents and children to seek advice at the bureau at any time during the secondary course, but they might be specially invited to come during the child's final year and not just a day or two before the leaving date. Intimate contact with the child's school would be maintained throughout, and the head master and any members of his staff detailed for the consideration of career or adjustment problems would be closely associated with it. If it is desired to link up the employment services (placing) with the advising services (educational and vocational), the conferences will now include persons who have direct contact with employers and who have made the problems of entry into employment their special concern. Indeed, we might profitably go further and at this point invite the active co-operation of the business and industrial interests of the community in the problems of the child's second transfer, this time from school to occupation. And further, of course, with this should be linked up the agencies for continued education and perhaps, also, for youth welfare.

It would be out of place at this point to pursue the line of thought in detail. It is sufficient to indicate that such an Educational Advice Bureau could be a vital factor in the effective organisation of the educational and vocational, if not the social, activities of the school communities. Inasmuch as it would provide a place where parents might seek advice largely free from the special prejudices of a particular school or schoolmaster and would help them to realise and to understand more fully than they do at present the contribution they themselves must make towards the effective utilisation of the available educational facilities, it would help appreciably to reduce the wastage which occurs in our present system. It would be useless to improve our technique of examination, or our courses of study, or our methods of teaching, if the same losses were to occur through lack of co-operation and understanding on the part of parents. While the first part of the proposals outlined above concerning admission to the secondary schools could no doubt be carried out by the staffs of the schools themselves, the effective co-ordination of all the services involved in the wider aims that arise in late adolescence suggests that more rapid progress will be made if they are provided for elsewhere, thus allowing the school to concentrate on its own tasks and not requiring it to diffuse its interests and energies over too many others. This argument has obviously even greater force when we remember that the additional duties at present borne by schools and teachers cannot be discharged without detriment to some aspects of their work. The provision of meals, for example, may become quite an important feature in school organisation, but it is not work for which teachers are trained or employed; and this point needs to be remembered by all advocates of social and educational reform who imagine that the secondary school of tomorrow will be the ideal place for carrying out their plans.

It may be thought that the age of eleven is too early for the kind of planning implied by the organisation outlined above. There are many secondary-school head masters who favour one general course for all their pupils, who would postpone consideration of career questions, and who dislike anything that suggests specialisation or a narrowing of the range of interests to be covered by school studies. This outlook is, however, almost entirely that of the 'academic' secondary school, and especially of those schools in which, through the highly selective procedures enforced by them, are to be found mainly those pupils whose high aptitudes or whose superior social experience and home environment enable them to obtain a place. It is not unjust to say that many of the teachers in such schools have only the vaguest knowledge, and certainly no real understanding, of the very different problems of other secondary schools.

One popular suggestion for dealing with the problem of immaturity is to provide for a change of school at eleven plus, but to postpone differentiation of courses for one year, and in some cases longer. This would be sound if we were likely to be better equipped for dealing with the problem after one year's delay. But if this year is to be spent in continuing work along the same general lines as in the primary school, what convincing reason can be given for the early transfer? On the other hand, if new subjects are to be begun and new programmes of study arranged, these cannot be planned efficiently on a self-contained one-year basis; they will have to be related to the alternatives planned to follow, and it may be impossible to avoid some sort of differentiation (implicitly by methods if not explicitly by subjects) between the children for whom they are provided. The year's postponement is not therefore likely to be advantageous unless we can show that the maturing of the child's abilities has taken place so unmistakably that decisions can now safely be taken which, a year previously, could not. And if it be suggested that the best ' test of ability for a secondary course ' is a year's trial at the work itself, the answer is that we have been using this method for many years and the wastage caused by it has been enormous.

Consider, however, what the fundamental problem really is. We are not proposing to choose a career for a child at the early age of eleven, even though we do see clearly that any decision we now make will affect the career problem later on. This is true also if we make no decision; even if we allow the child to take any course he likes it is still true. Some head masters would allow parents and children free choice provided the parents accept the responsibility for their failure. But apart from the creation of unnecessary problems for the teachers concerned with such children, it is surely unwise that the experience and knowledge of persons trained in examining and assessing the abilities of children should not be used. On the contrary, parents should be encouraged to respect and accept the considered opinion of those whose task is to give it; and this, of course, implies that the opinion is based on sufficient evidence and is not coloured by the personal prejudices of the person making it.

The professional opinion to be offered to the parent when the child is eleven or twelve is entirely an educational one. It should consist of a statement of the child's abilities, attainments and general personality as so far determined and an outline of the course of studies proposed. If the parent then asks what connection, if any, there is between this course of studies and a particular occupation, or why a subject, such as Latin or book-keeping, is not included in the suggested curriculum, the adviser must be prepared to give a sound answer. As we shall see later,[1] probably the best form of differentiation is progressive, the first being into broad categories where the resemblances between courses are greater than their differences, the next being subdivisions of these broader classes which take on more and more of a vocational character as the child approaches his entry to occupational life. But the first division into broad categories is obviously dependent for its final success upon a satisfactory integration of the whole programme, and therefore, as repeatedly emphasised in these pages, upon seeing the first problem in its relation to the later one. So that, although no final choice of a career is involved in the decision at eleven plus, there must be in the adviser's mind a knowledge of the connections between the two, and if the parent asks, as he surely will, what kind of career may be expected to follow, the answer need not, and should not, be evaded. It is part of our purpose here to discuss the nature of these answers, but this will require a chapter to itself. The next step is to describe in outline what we ought to know about the child of eleven in order that such differentiation may be attempted.

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[1] Chapters VI and VIII.

A complete description should include the three main aspects—personality, mental power and physique, but although these are conveniently discussed separately, we have to remember that the individual child with whom we are dealing is never just one of them, say, a mind in a body of no consequence, or a personality with no mental powers of any interest or concern to us. He is, of course, always, all three aspects acting as one self-directing organism.

1. *Personality*

What we call personality is the concrete expression of the individual's ' self ' in those characteristic attributes, those modes of action and those manners which distinguish him from others of the same family, tribe or race. Compared with what it is at later stages it cannot be said that the child's personality is markedly developed by the time he is eleven. Nevertheless, he is distinguishable from his fellows by more than his external features and appearance. The behaviour of most children at this age is probably not quite so ' individualistic ' as it was in infancy, because it now conforms more or less closely to patterns set by the environment in which they have lived; yet it is seldom exactly like the pattern and never entirely colourless. There are always some aspects worthy of observation.

Especially is this the case in regard to the individual's relations with others. Generally speaking, he is self-centred, in the sense that thoughtfulness for others does not come easily into his mental processes or find much practical expression in his actions. Nevertheless, he has been trained for some years in *habits* of conduct which foster harmonious relations with other people and he has been given *ideas* regarding the appropriateness of such behaviour which presently will blossom into the *ideals* of adolescence. But the time is not yet ripe for this flowering, and much will depend upon what happens to him during the next few years. Up to eleven the joint efforts of parents and teachers have been, or should have been, devoted to establishing habits of neatness and tidiness, careful attention to detail, punctuality, patience, obedience, diligence, politeness, respect for older people and the like. But the results of their exhortations and example vary considerably, not merely because such influences are seldom applied systematically, but also because there are considerable differences in the individual's temperament, as expressed in traits such as suggestibility, docility, self-confidence, etc., as well as in his ability to learn from the examples supplied to him. Whether, for example, his own self-assertion expresses itself in a physical pugnacious aggressiveness or in a striving to achieve an intellectual superiority in class depends partly upon his natural endowment and partly on the influence of his home and social environment.

The development of personality, again, is never independent of mental processes because, at all stages, there are required, not only memory for instruction given or consequences experienced, but also the ability to discriminate between right and wrong actions (whether intuitively or through instruction), and between good and evil results (whether through direct personal experience or through the communicated experience of others). Later, when behaviour becomes more *self*-controlled, there is required the ability to understand the rational bases of prescribed modes of behaviour and the ability to develop *by his own mental powers* suitable directing ideas and ideals. This need is particularly marked in the youth's relations with others and in the development of the social graces. The control of an anti-social impulse by any higher motive than fear of painful consequences involves more than a keen and vivid memory of past experiences and an elementary appreciation of cause and effect; it involves a perception of complex social relationships and the application of concepts of duty and of service which can only be satisfactorily developed if the individual has the necessary mental ability. It is generally acknowledged that delinquency is often associated with low 'intelligence,' and conversely, there is frequently a very close association between high natural ability and acceptable personality traits. It follows, of course, that the means and methods of inculcating self-discipline and ideals of behaviour and conduct must differ considerably as between school groups composed mainly of capable children and groups composed chiefly of less capable children. The latter cannot be expected to absorb right ideas merely through living in a good school environment; more positive methods will probably be needed. Certainly many more delinquents (in out-of-school activities) are to be found among the children who cannot, or who only just, qualify for a secondary course (even when their behaviour in school is quite satisfactory) than among any other class of pupil. It is not suggested, however, that lack of ability is the *cause* of it; the basic causes lie in the home and social environment.

Although the child is self-centred at eleven, the anti-social manifestations, such as rebelliousness in its various forms (impertinence, truancy, disobedience, etc.) or self-indulgence (laziness, malingering, etc.), are not usually exhibited in any strength. These become more marked with the onset of puberty; at eleven, however, the child is mostly amenable to very complete direction and control by his elders, he is not yet inclined to challenge authority or to seek escape from control by any of the processes which are so common a year or two later. He is very dependent upon the guidance and direction of his elders, a dependence which is emphasised by the usual classroom routine of the primary school. Here the dependence is upon one or two persons, the parent and the class teacher of the year, and these take a prominent place in the child's daily activities. It is a considerable change, especially to a child barely eleven, to pass from the sometimes tender solicitude and care experienced in a class in a primary school to the impersonal atmosphere of a large group in a secondary school, where the child is expected to learn by *his own effort* much more than before, where the teacher seems more concerned with the difficulties of the subject than with those of the pupil, and where different teachers make extensive demands upon his time, energy, effort and ability. Whenever a new pupil 'settles down' easily and quickly in a secondary school he is evidently quite ready *emotionally* for this important change, but when he does not the reason may be partly mental and partly emotional, and it is necessary to discover which.

2. *Mental aspects*

The abilities of young children are at first mostly disconnected and unorganised. Diverse experiences are not readily coordinated in their minds; to them learning is a specific response to a specific situation, and 'trial and error' is the universal method. Large numbers of such situations appear as unrelated objects and events until the need for perceiving similarities and differences arises. The mark of the child's ability to learn, apart from the efficiency and suitability of his responses, is seen in the extent to which he develops in his own mind a prompt and accurate perception of *related* objects and events. Unless he can perceive essential differences beneath the superficial similarities with which he is surrounded (and, vice versa, see similarity in apparent diversity), his learning is slow and ineffective. Colour, shape, juxtaposition in space or in time, and the like are not attributes of the object until they become such in the mind of the perceiving individual. Hence the grouping of experiences connected with certain types of mental processes takes place because minds work in similar ways and because they apply these experiences to the solution of similar problems.

By the time he reaches eleven the child has accumulated, through the processes of sense perception, a considerable amount of experience, and he has acquired a number of useful habits and skills.

One important group of activities centres in the comprehension of verbal relations; on these rest the necessary skills in speaking, reading and oral composition.

Another group of activities is based upon the clear grasp of relations of number and space, and these, in turn, are linked with the first group through processes of symbolic representation.

A further group of activities is concerned with the recognition of attributes, i.e. relations of colour, shape, size, material or substance, use or purpose, etc., which go to make up facts about objects or persons and which form the basis of processes of reasoning about them.

Further groups of relations are concerned with identity and difference, with cause and effect, with juxtaposition in space and time. Reasoning processes occur when the individual passes beyond direct experience, as, e.g., when he argues that because $a=b$ and $b=c$, a must also be equal to c.

Finally, the utilisation of the experience so acquired involves appropriate bodily action; hence the need for acquiring skill in bodily control where the muscular movement is directed towards achieving some complex purpose. Writing and figuring, handwork in all its forms, the use of tools and machines, all these possess both a physical basis and a mental basis, the former to enable the skilled movements to be developed, the latter to ensure that they are *properly* developed in relation to the purpose desired.

Applying this general outline to the particular case of the eleven-year-old child, we observe that during the years he has been under instruction in the primary school there has been a steady development in the *ability to learn* as well as in the results of learning. This development is not principally a product of instruction since it is more akin to a maturing of the child's natural endowment, stimulated, however, by the everyday experiences of the home, the field and the street as well as of the classroom. The differences between the two sets of experiences are quite marked. The skills and attainments gained in school are systematised and formal (or at least they would be if there were no interference from extraneous factors), whereas those resulting from out-of-school activities are haphazard and disconnected. The latter may, however, by reason of their vividness and pertinence, contribute more to the child's mental growth than the former. After years of systematic educational effort we do not know precisely how important each is, though Stanley Hall long ago demonstrated that the content of children's minds is often enriched more by the experiences of the holiday period than by those of the classroom.

If this be really so, we might, with advantage, place less emphasis than we do on the regimented routine of our classroom and laboratory activities, even at the secondary stage, and admit that there is probably room for many other valuable, if less systematised (and therefore not examinable), experiences. We shall grant, of course, that unless, for example, a child has been taught number relations systematically he may not be able at eleven to operate fractions or to make calculations involving sums of money, weights and measures. But we should also remember that it does not necessarily require the five or six years before eleven to accomplish the actual teaching. Even though number teaching may begin at six, at five or even earlier, it has always to wait for the natural development of the child's mental processes, a development which in the case of some children never seems to take place properly, for their ability to handle number relations remains meagre and inefficient through their lives. When perception is developing satisfactorily it is observable that a delay in the commencement of formal instruction, either in reading or in number operations, may produce no apparent loss of efficiency or skill in selected individuals, though the collective attainments of groups are undoubtedly proportional to the length of time under instruction.[1]

Such observations seem to show that operations which are intricate and difficult at one stage, and which only produce perplexity and confusion, can become easy and straightforward later on, and that this is not just the effect of more instruction and practice. Grammar is a good example. Similarly, the fact that activities which are difficult for one child are easy for another seems to be a sign that, irrespective of age, the mental maturity of the one is not yet equal to that of the other. This truth is less easy to perceive in the classroom because the common aggravating causes of slow progress, such as illness, removal, etc., occur in circumstances when there is no compensating environmental influence and when there is much dissipation of energy in the irregular re-startings after periods of absence. Moreover, the tests of growing power it has been customary to apply have been those which are most dependent upon systematic instruction in school and therefore most susceptible to its interruption.

To prepare for the examination procedure to be discussed in the next chapter, we may now consider briefly the main features in the growth of the child's mental abilities during the year or two preceding the age of promotion. The details are derived chiefly from an analysis of the processes used in testing a child's ability to learn, and especially those used by Binet and subsequent investigators, notably Terman and Burt. In so doing we are not basing our conclusions on one man's experience or opinion, but on the results of the careful study of thousands of cases by many investigators.

If we measure the child's knowledge of words by seeing how many of a selected list are known to him, we find that all children of average mental ability can recognise and define a certain number of words by the time they are nine. In two years of further growth and experience the number has increased by 50 per cent., and in four years by 100 per cent. The process of definition has also undergone considerable development, for by the age of eleven it involves clear understanding of relations of identity and difference, the comparison between two or more objects being now effected in terms of their attributes as well as in terms of their function or their use. Giving a definition in terms of use appears quite early (at four or five) and continues for a long time. By the age of eight the child is using some of the observable attributes, both qualitative and quantitative, of the objects to be defined, but his choice is not nearly so accurate or so appropriate as it becomes by the age of eleven. It seems to require three or four years of mental growth in order that the ability to discriminate the likenesses and the differences between *two* things may become sufficiently developed to be applied successfully to *three* things.

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[1] Macgregor, *Achievement Tests in the Primary School,* 1934 (Univ of Lond. Press, Ltd).

This important difference is, of course, exhibited not only in the appropriateness and completeness of the child's use and understanding of words, but in other processes also. The child's memory for ideas, for example, as tested by *immediate* recall, is not very well organised at eight years, for when a short story is read to him he can only recall two or three of the details. It requires two further years before he can co-ordinate the associated ideas well enough to reproduce them without further repetition or prompting.

His memory for a sequence of syllables or numbers shows similar development. At eight years he can recall a sentence of 14 syllables, at nine or ten he can repeat 6 digits in the order given, or repeat 4 digits in the reverse of the order given, while at eleven he can repeat 20 syllables and reverse 5 digits. Reversing 6 digits is so much more difficult that we have to wait until he is an adult before we can expect him to accomplish it, and even then only if he is of superior mental ability.

Experiences based on sensations and movements are no longer disconnected, but each is linked with many others through associations of time, place, similarity, cause and so forth. At eight the child can give the date, name common coins and give the correct change in simple shopping transactions. These seem to be items of information, the results of teaching or special experience, and not signs of developing mental capacity. But the element of mental growth is there, since it is usually found that the *order* of the months of the year is not properly known until the child is ten, although the *names* are known much earlier.

Other indications of growth are seen in the power to solve a simple problem involving experiences familiar to the child. At eight the problem is not fully grasped and the solution offered is only a partial one; we have to wait until the child is twelve before he is capable of a complete solution.

Similarly with space perception; at the age of nine a simple practical puzzle involving space relations can be successfully solved, but the more accurate perception of such relations, in the detail required to reproduce from memory two simple drawings after seeing them for a few seconds, does not occur until the child is two years older. Again, we have to wait for the essential development in the co-ordination of observed details before we can expect success in a task at this level of difficulty. At still higher levels the simpler problems of space perception are complicated by the introduction of causal and other relations; similarly, in dealing with abstract instead of concrete problems a much more complete co-ordination of related experience is necessary, and this requires time to develop.

Dexterities also develop as the child grows, but in these there are two mutually opposing aspects—speed and accuracy. Inasmuch as both depend on practice, increased by age, one would expect both to improve with age. But in some dexterities the attempt to reach high speed seems to reduce accuracy, and vice versa. Finger control has developed by the age of seven to enable the child to do such things as tie a bow knot, and use a pencil to draw and write with fair accuracy. By eleven, although growth is not yet complete, there has developed a quite considerable skill in muscular control, especially as applied to the practical activities of the classroom and the home. There is, however, a mental aspect, for although the physiological basis of the skill depends upon the growth or maturing of the afferent and efferent nerve fibres and upon the establishment of appropriate movement responses by controlled practice, the modifications in the various applications of acquired skills to meet new situations or changing circumstances in old situations require much more than this. It is for this reason that crafts have a high educational value in themselves.

3. *Physical condition*

Little need be said about the child's physical attributes at the age of eleven, although children do vary markedly in size, in weight and in muscular strength. These details are not important in themselves at this stage, though they obviously become important later when the choice of an occupation is being considered. But we do need to consider how a child's physical fitness, or lack of it, will affect his progress in the secondary school; and if his physical condition is not what it ought to be, we should take effective steps to have the remedies applied. This implies two things—systematic medical examination and prompt treatment, and the provision for both of these should be as complete as possible.

In this connection more frequent and more effective contacts between the school medical and dental services and the parents are necessary, and one excellent opportunity for securing the direct interest of the latter arises at the stage of transfer to the secondary department. If admission were conditional upon a 'clear' medical and dental report, appropriate facilities being available, considerable improvement would take place very quickly. As already mentioned, the work of the Educational Advice Bureau might advantageously be associated with that of the medical services, and to regard eleven as one of the 'critical' points seems both practicable and sensible.

The main details of the child's physical or nervous condition which the secondary school requires to know on admission are those connected with:

(*a*) exemption (in full or in part) from participation in school games or physical exercises;

(*b*) the formation of special classes for the treatment of remediable defects;

(*c*) the provision of additional nutrition (food, milk, etc.);

(*d*) adjustments required by pupils who are slightly deaf, colour-blind, etc.

Arrangements would also be made, of course, for the subsequent examination of those who develop the need of medical supervision after admission as well as for the continued supervision of those who were receiving it on admission.

Other 'critical' points might occur for some pupils during puberty; and there is also one other important point at which the consideration of the physical development and condition seems desirable for all, viz. just before leaving school to enter employment; but these may more properly be discussed in connection with the problems of the later stages.

Summing up, the main argument of this chapter is that the child is an individual who requires as much consideration at eleven as he does at sixteen or seventeen. His fitness for promotion depends upon the physical and mental maturity which he has reached and which should be ascertained by the most reliable methods. Mass examinations and group decisions are not effective ways of dealing with important personal problems, whose proper solution at eleven is an essential step in their solution at sixteen or later.

Scientific analysis of the growth in the mental and physical attributes of the child before eleven emphasises our need to ascertain the individual's stage of development *in every detail* and not simply in terms of a general summary which hides and does not disclose significant individual differences; from such detailed studies it may be discovered that one child has a poor vocabulary and lacks the ability to work effectively with verbal material, or that another possesses excellent verbal abilities but has failed to develop a corresponding efficiency in dealing with numbers or with causal relations. The pedagogic problem posed by such facts is whether these shortcomings can be remedied by suitable teaching or whether, if they cannot, the school should so organise itself that the individual's best abilities can develop *at their own pace* without being retarded by the endeavour to raise his inferior abilities to the same level.[1]

Examples having been given of the way in which the development of knowledge and skill waits upon the natural growth of the child's body and mind, this synopsis will be appropriately completed by setting out in schematic form the principal aspects of the threefold development of the child which it is necessary to study at this stage. The methods of study and examination, however, will require a separate chapter.

ASPECTS OF CHILD'S THREEFOLD DEVELOPMENT

(as a basis for individual inventory)

I. PERSONALITY—the 'self' expressed in action:
    respect for elders,
    obedience,
    co-operativeness,
    self-display,
    self-confidence (self-assertion or self-reliance),
    fearlessness or courage (as opposed to timidity),
    calmness under pressure,
    initiative,
    persistence,
    conscientiousness,
    consistency and care,
    neatness and tidiness,
    punctuality,
    trustworthiness,
    self-indulgence.

II. MIND—
  (*a*) understanding of verbal relations:
    word meaning—vocabulary—synonym and antonym,
    sentence construction—sequence of ideas—paragraph,

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[1] These and allied problems are discussed in Chapters V, VI and VII.

comprehension of meaning (reading),
form of expression—rhythm, rhyme, prose and poetry,
choice of word—appropriateness in relation to context.

(*b*) recognition of attributes (facts about objects and persons of the environment):
identity and difference,
colour and material,
size and shape,
use or function.

(*c*) comprehension of number relations:
part-whole relationship.

(*d*) perception of space relations:
juxtaposition in space, sequence in time.

(*e*) grasp of causal relations:
inference—problem solving,
laws and examples,
induction and deduction.

III. BODY—

(*a*) dexterities of hand, of leg and arm:
handwork in all its forms,
writing, drawing, needlework, craftwork, etc.

(*b*) games and exercises—play.

(*c*) hygiene and care of the body.

CHAPTER III

BASIS OF ADMISSION TO A SECONDARY SCHOOL. INDIVIDUAL INVENTORIES

TURNING now to the problem of the individual child, we have to consider how we may best obtain and record the information outlined in the concluding pages of the last chapter. It will be needed by all who attempt to advise parent and child regarding the choice of a curriculum of studies as well as by the organisers of the school to which he is to be admitted, and especially by those who are to decide *how* he is to be educated when he arrives there.

The fact that cumulative records, mental tests and other measures are used for these purposes has already been mentioned, but a more critical examination of their place and value must now be given. Each of these measures may have some value in itself, but it does not necessarily follow that the best procedure is the one which includes them all. We need to ascertain as precisely as possible the contribution each can make, and in what circumstances its use, alone or in combination with other measures, will be most effective.[1] Moreover, the common assumption that a child *ought* to display ability in French or in Mathematics at the age of fifteen or sixteen because he was able to pass at the age of eleven an examination in Composition, Dictation, Grammar and Arithmetic may be seriously doubted. It is true, of course, that in the past many children have done both; it is equally true that many have not. Have we any proof of an essential connection between the mental processes used at the two stages? Whatever be the method of selecting pupils for more advanced courses of instruction, the test of its efficiency *must* lie in the extent to which it reveals those pupils with the abilities requisite for ultimate success in school studies. And if the standard of difficulty relative to the age and maturity of the candidate is greater at sixteen than it is at eleven, the value of the examination at eleven as a procedure of selection is likely to be small.

The cumulative record

The cumulative record, adequately compiled, presents a

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[1] Cf. McClelland, *Selection for Secondary Education*, 1942 (Univ. of Lond. Press, Ltd.). Further reference is made on p. 64.

'picture' of the individual which becomes progressively more accurate and useful as the details accumulate. It records the opinions of the child's teachers from stage to stage, and although these are liable to error, the size of this error can be reduced by giving teachers suitable guidance in the task of recording their opinions faithfully and systematically.

If these opinions are concerned with the actual skill and knowledge possessed by the child, they constitute a valuable means of determining progress from year to year, disclosing perhaps the stages at which it was accelerated or diminished, or at which difficulties not wholly overcome began to appear. Such information is particularly helpful to those whose task is to provide remedial treatment for the children who fall behind, but it is also needed by those engaged in assessing the child's natural aptitudes.

But the effective use of such information depends upon the extent to which the entries in the cumulative record are related to appropriate standards which are thoroughly understood and properly applied by its compilers. And yet, where cumulative records are in use, few of them comply with these conditions. Many records consist solely, or mainly, of teachers' marks in different subjects, expressed sometimes as percentages, sometimes as Ex., V.G., G., etc., with no definite standards of reference whatever. There is, undoubtedly, a general tendency among teachers, when assessing children in these terms, to refer to standards of achievement normally expected at that particular stage, but these expectations do, in fact, vary a great deal from place to place and from teacher to teacher. Even when the assessments of attainment are required in terms of ratings on a graded scale, as, for example, the five-point scale A, B, C, D, E, where C represents the average, the same variations will occur unless the ratings are based upon some objective measures previously determined and standardised. Similar dangers occur in describing a child's temperament, for the teacher is strongly inclined to judge by comparison with the little 'angels' who give him most pleasure or with the little 'devils' who create the most difficult problems.

Clearly, these dangers can be much reduced, perhaps eliminated altogether, if the cumulative record is built up, in regard to achievements, at least, from objective and suitably graded measures. The teacher, instead of reporting on the results of examinations set and marked by himself according to no particular scale of values, would be asked to use measures designed for this special purpose, standardised over a wide area, recorded in universally acceptable terms, and immediately available for comparison with those of children from other schools at corresponding stages of instruction. This is, admittedly, impossible of achievement at present, though graded tests of reading, spelling, number operations and the like have been accumulating for some years, but it could be achieved if educational administrators would pool their ideas and methods.

In regard to aspects of the child's behaviour, such as the expression of temperament and character, which cannot be measured by objective tests, the same principles apply, though other methods of standardising the estimates must be employed. The assessment of temperament is, of course, much more difficult than the measurement of attainment, and it may seem odd to suggest that teachers who often do the easier task badly should be asked and expected to do the more difficult task better. Yet there is no other way. Personal contacts are necessary in assessing temperament and character, whereas in measuring knowledge and skill they are not. If, therefore, having trained them to do it, we ask teachers to study the manifestations of growth in the child's personality in the classroom and in the playground with the same care as they have hitherto given to his shortcomings in spelling and in subtraction, we shall have access to information which cannot otherwise be obtained.

Unless we do this, the cumulative record will tell us no more than a well-devised test of attainment will do, and accordingly will not be worth the time and thought expended upon it. Schools are already burdened with schedules, forms and statistics, some of which do not seem to serve any very useful purpose. Let us not overwhelm the schools of tomorrow with unnecessary record keeping, for data which lie forgotten in the files of administrative offices signify nothing except hours of unproductive labour. If we are satisfied that we *need* teachers' reports as expressed in cumulative record cards, let us make sure, first, that they are properly and helpfully compiled, and then, that they are adequately used. Their purpose is clearly twofold:

(*a*) to exhibit changes in rate of progress, whereby, having regard to temperamental and other influences, adjustments can be prescribed and applied without undue delay;

(*b*) to give information regarding speed and efficiency of learning in different aspects of the educational environment by means of which natural aptitudes may be assessed.

Nevertheless, periodic and systematic examination of children by standard measures should not be required from teachers if it is established beyond reasonable doubt that all the information about aptitude and attainment needed to classify the child at the secondary stage (and this is the most important purpose to be served) can be obtained from one or more specially devised tests at the termination of the primary stage. There is some evidence that *at present* the results of such tests are often more reliable than teachers' estimates and more valuable in forecasting subsequent success in school studies, but this does not necessarily mean that the teachers' estimates cannot be improved.[1] If the best measures by each method are equally valid and equally helpful, then we must use those which require the least number of persons to provide the required data. This last would be the case if tests of attainment were given by the staff of the advisory bureau as part of their procedure of investigation. One advantage of this, apart from consistency in the technique of examination, would lie in the fact that the results would then be less likely to be looked upon by interested persons as a measure of the efficiency of the primary schools concerned. Such would plainly not be part of the expert examiner's duty, for his interest is, or should be, entirely in the welfare of the individual child.

On the other hand, the work of the advisory bureau might be so organised that the teachers in the schools would regard it as their duty and privilege to contribute to its smooth and efficient working by undertaking the whole of these assessments. In that case the educational tests to be used, the standards to be employed and the form in which the results were to be expressed would be determined by the educational advisers in relation to their particular needs. Nevertheless, in addition to the data provided directly by tests and examinations, there would be the information collected by personal observation of the child in action, and the more fully the collector (the teacher) understood the purposes to be served by the user (the educational adviser), the better would this be done. The need for close collaboration between the teachers and the advisory bureau is, however, evident, no matter whose is the task of applying the standard tests.

Aptitude tests

So far, the assessment of inborn aptitudes has been referred to rather as an inference from the accumulated observations of teachers or from the results of periodic tests of attainment than as a task of measurement in itself. Yet many attempts have been made, some with considerable success, to measure aptitude as contrasted with attainment. These, so far as the schools have been concerned, have been mainly of one special type. So long as psychologists and educationists in Britain considered that the main ability involved in work in school was 'intelligence,' most of their efforts were directed towards preparing and improving those well-known and much-used 'tests of intelligence' upon which so much investigation and subsequent theorising have been based. G. H. Thomson, in particular, has supervised the preparation of many such under the general name of Moray House Tests, and there have been numerous others. They are much alike in form and content, but even where they differ they depend upon the same basic mental processes—memory for various kinds of sense experience, the perception of relations of various sorts, and simple reasoning (or in Spearman's terms, the eduction of correlates).

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[1] Cf. McClelland, *op. cit.*, p. 34 and p. 64 below.

Important investigations have been directed during the last twenty years towards determining whether 'intelligence' tests alone, or in combination with other measures, provide a sufficient basis for forecasting an individual's progress in the advanced school studies of the secondary stage. On the whole, these researches have shown that of all the different kinds of information it is possible to obtain *before* a child begins a secondary-school course, the result of a good 'intelligence' test is often the best *single* measure, but that there is more likelihood of its prognosis being correct if it is supported by other measures, such as attainment tests or primary-school records.[1]

(Some investigators suggest that a better single measure is to be found in the cumulative record of the first year in the secondary school. But the relationship measured here is between schooling of one particular type and further schooling of the *same type,* whereas what we usually need are such measures of aptitude as will enable us to prescribe different types of schooling, each appropriate to the different *types of aptitude* disclosed by our examinations or tests or cumulative records. To say, therefore, that the best way to solve the aptitude problem is to postpone it until the end of the first post-primary year is to evade the issue, for the problem still remains for those whose first-year records are unsatisfactory. Moreover, postponement will only serve when the school curriculum is narrowly restricted and the alternatives to be considered are few; in all other cases it creates additional problems by increasing the number of wrongly directed individuals.)

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[1] In McClelland's investigation a scholastic examination was found to be the best single measure, but there were special reasons for this See p. 64.

But helpful though the 'intelligence' test has been, the time has come to examine its use critically. Hitherto, the results of such tests have been expressed as mental ratios or intelligence quotients, these being the numerical value of the ratio between the child's actual maturity, as measured by the tests, and the average maturity expected of a child of the same age. The relation between the child's mental ratio measured on admission to the secondary school and the child's success in scholastic examinations four or five years later has been studied by many. Most of them report a high degree of similarity: children with high mental ratios tend to do better than those with low mental ratios. When they do not, a more detailed study may disclose qualities of temperament and character (positive or negative) to which some discrepancies can reasonably be attributed. But not all can be explained in these ways.

The results of a study of this problem in a large secondary school over a long period are summarised in Table I, confirming the view expressed some years ago that a mental ratio provides only a partial solution of the problem before us. Used in forecasting success in the examinations which come at the end of a secondary-school course, the ratio has a high predictive value, but while it tells which individuals are likely to succeed in the examination and which are likely to fail, it does not itself enable us to say in which *subjects* they will excel or in which they will do badly. In the cases cited[1] it was observed that practically all pupils whose mental ratio exceeded 120 reached the 'all-round' standard demanded by the certificate examination, whereas only four-fifths of those whose mental ratio was less than 120 but more than 112 and who remained at school to complete the course eventually reached a similar standard. Moreover, of those whose mental ratio was less than 112, only one-fifth were ultimately successful.

In applying such results to a different group of pupils the investigator might confidently predict the result in all cases where the ascertained M.R. is below 112[2] or above 120, but he would be unable to be so confident regarding the remainder *unless he had supplementary information.* He could estimate the probable number of successful candidates with a high degree of accuracy, but he could not predict which individuals would, in fact, be the successful ones.

In Table I are gathered together the data regarding pupils admitted to literary courses (i.e. courses including one modern foreign language) in a typical Scottish senior secondary school during the eight years from 1929 to 1936. The mental ratio on admission was ascertained by 'group' examination. The table classifies the pupils according to their mental ratio and shows how this is related to the results of their studies. The following categories are used:

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[1] Earle, *Tests of Ability for Secondary School Courses*, 1936 (Univ. of Lond. Press, Ltd.).

[2] Some investigators suggest 106 as the lower limit.

(*a*) Pupils who successfully completed the Senior Leaving Certificate course and then continued study at a University or other Institution for Higher Education.

(*b*) Pupils who successfully completed the Senior Leaving Certificate course and then entered employment (articled, apprenticed or otherwise).

(*c*) Pupils who reached or went beyond the Junior Certificate stage, but who did not obtain (or try to obtain) a Senior Certificate.

(*d*) Pupils who failed to qualify for a Junior Certificate either through leaving school too early or through inability to reach the standard required.

TABLE I

CLASSIFICATION OF PUPILS [1] BY MENTAL RATIO AND SUBSEQUENT ATTAINMENT

(Pupils entered for *Literary Courses* [2] between 1929 and 1936 [3])

MENTAL RATIO

	120 *and over*	112–119	106–111	*Below* 106	*Total*	*Percentage*
a	76	8	1	0	85	6·8
b	87	56	14	2	159	12·5
c	229	152	72	39	492	38·9
d	91	120	130	188	529	41·8
Total	483	336	217	229	1265	

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[1] The separate figures for boys and girls are added, since no significant differences were found.

[2] Academic type—one foreign language at least; many of those in categories *a* and *b* studied two; some studied three

[3] Variations from year to year were remarkably small. The total figures and the percentages calculated from them differ only slightly from the corresponding figures for each year from 1929 to 1936

It will be observed:

(i) That of the total number of pupils who commenced a course containing a modern foreign language, barely 20 per cent. in round figures (244 out of 1,265) reached the standard of the Leaving Certificate, while 40 per cent., for various reasons, failed to qualify for a Junior Certificate.

(ii) That of the pupils whose mental ratio was 120 or more, over 80 per cent. reached or surpassed the standard of the Junior Certificate, but rather more than half stopped at that stage, and only 34 per cent. completed the higher stage successfully. (Of the total intake of pupils, those whose M.R. was 120 accounted for 39 per cent.)

(iii) That of the pupils whose M.R. was between 112 and 119, 64 per cent. reached or surpassed the standard of the Junior Certificate, but nearly three-quarters of these got no further, and only 19 per cent. (one in five) completed the higher stage successfully. (Of the total intake, those in this category numbered 26 per cent.)

(iv) That of the pupils whose M.R. was below 112, only 17 (less than 4 per cent.) reached the standard of the Leaving Certificate (some of them taking seven years to do it), a further 111 (approximately 25 per cent.) reached the standard of the Junior Certificate (though very many required four years to do it), but the great majority (70 per cent.) failed to reach that standard. (The total number in this category, 446, represented 36 per cent. of the intake.)

In the same school during the same period of eight years an equal number of boys and girls began courses of a non-linguistic type. Their mental ratios were, as might be expected, mainly from 106 to 80, but there were also a fair number of more intelligent children, who, having no intention of staying at school longer than was necessary, preferred to take the more practical courses of instruction and to leave without qualifying for a Junior Certificate. The M.R. of those who did remain to qualify was invariably more than 112. Figures for these groups, since the pupils in them are not so consistently motivated by the desire to do well in school studies as are the pupils in literary classes, cannot be so readily dissected, even in relation to attainments of a lower standard. But they do establish, just as definitely as do those of Table I, that the attainment of the all-round scholastic standards, represented by a Junior Certificate or a Leaving Certificate, can, under existing conditions, be expected only from children who are above the average.

Taking the mean mental ratio of an unselected age group as 100, we can regard as ‘ average ’ those whose mental ratio falls between 106 and 94 (allowing a margin for error of two to three points at each extreme). This would leave us with a group of 'good average' children of mental ratio 106 to 112, to whom, according to Table I, the Leaving Certificate course appears to have been a formidable undertaking. Why was it so difficult for such children to achieve complete success?

This result was partly due to the fact that the examinations current during the eight years under review demanded an 'all-roundness' in scholastic achievement which many of these children could not attain. At the Leaving Certificate Examination this was a generally recognised fact, for although weakness in one subject might sometimes be compensated for by outstanding strength in another, this had to be very outstanding, while there were limits, rigidly fixed, below which no compensation could operate at all. The Junior Certificate, in less degree, made similar 'all-round' demands.

It is no part of the purpose of this chapter to discuss the appropriateness of these demands, but their effect should be noted. The concept of 'all-roundness' which has dominated the regulations governing the examinations for School and Leaving Certificates, and the concept of 'general intelligence,' as the ability expressed in an 'all-round' performance, are so clearly related that it is not surprising that tests of the latter should have had considerable prognostic value in regard to the former. But their usefulness ends there. The adviser of the individual child requires much more information than a mental ratio can give him.

The inadequacy of the M.R. for the guidance of the individual is shown quite clearly in Table I. This table discloses that at least one-third, and possibly 40 per cent., of the children admitted to this secondary school to begin the course with a literary or linguistic bias there provided, were ill-directed and ill-advised. This is partly due to the fact that usually the only alternative to a 'literary' course is a 'technical' one which, being associated with industrial and business activities, does not commend itself to parents or pupils. But it is by no means certain that a child of M.R. less than 106 who lacks the ability to achieve the 'all-round' success demanded by a literary course will do any better if taught bench work and technical drawing instead of Latin or French. Sometimes he does, quite often he does not.

The remedy seems to lie principally in some modification of the 'all-round' concept which dominates the final examinations. The position may also be improved by changes in curricula and methods, and in the better guidance of the individual which we may expect to result from the revised examination procedures at the transition stage. Hitherto, this problem has not been properly faced because its magnitude has been underestimated and because the causes of failure have not been sufficiently studied.

It should be more generally recognised and accepted that complete 'all-roundness' in scholastic attainment is not a very common phenomenon in school work. There are a few brilliant individuals who seem to do well in everything, but even they sooner or later display a preference for Literature, for Mathematics, Science or Philosophy. At the other extreme are a few who are unable to do anything with an efficiency and a speed comparable with that of the average performer. Between these two extremes are the great majority, who, while apparently incapable of attaining the highest levels in all the diverse activities of the school and the community, are yet able to distinguish themselves in one or two selected activities. This potential ability is lost sight of, and may even remain undeveloped, when the child's interests and energies are directed into unfruitful channels.

The first step towards improvement involves, therefore, an attempt to measure and define more precisely the child's abilities, and to assess the possibilities of their development along specified lines. It was suggested some years ago that the basic abilities involved in school studies were readily distinguishable, and that they grouped themselves according to the main types of work attempted. Thus, the group of abilities used in English subjects and in the study of languages differ quite markedly from those required in the study of Mathematics and Engineering, or those used in Science subjects generally. Analyses of school marks in relation to special tests showed conclusively that the abilities used in English, History and Languages were also present in verbal tests, while the abilities used in Geography and Science were in some way related to the abilities employed in comprehension and in reasoning tests. Moreover, the fundamental processes in Arithmetic, Algebra and Geometry were more related to those applied in the manipulation of number and form relations than in any other types of mental process. Art alone, among school subjects, seemed to depend upon an ability (or abilities) quite unconnected with those required in other subjects. A full account of the investigation and the results obtained between 1931 and 1935 was published by the Scottish Council for Research in Education in 1936.[1] Since then information has been steadily accumulating regarding the validity of the tests therein described.

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[1] Earle, *op. cit.*

The tests were four in number:

(1) Ability in the use of Words.
(2) Ability for Science.
(3) Ability for Algebra.
(4) Ability for Geometry.

They were devised for use with pupils just commencing a secondary-school course in the endeavour to find a set of measures which would enable the school administrator or the educational adviser to estimate the likelihood that any particular child would, at the end of three, four or five years (as the case might be), reach the standard of attainment prescribed for a pass in a recognised certificate examination. But the prognosis of a pass was to be based not on any 'all-round' or composite measure such as the 'intelligence' test provides, but on the separate measurement of the abilities needed in the principal groups of subjects—English, Language, Mathematics, etc. (In Scotland a Junior Certificate can be obtained after three years and a Leaving Certificate after five years, whereas in England the School Certificate is obtainable after four years.)

In spite of the fact that these certificates represent different levels of achievement, it is clear from studies such as those summarised in Table I that the 'all-roundness' in attainment required for such a certificate limits their award to pupils of at least 'average plus' ability (though this is certainly not so marked for the Scottish Junior Certificate as it is for the other two). Yet pupils of 'average' ability may possess special abilities in Mathematics, Science, Handicraft, etc., and the discovery of these is important.

The tests themselves were constructed in the main from items previously used to measure intelligence, but special care was taken to collect together those items and those types of mental process which seemed to have a *special* connection with subjects grouped as described above. After numerous trials, corrections, alterations and improvements, the tests eventually took the form in which they were published in 1936. Since then, they have been given regularly to each successive intake of pupils, the scores obtained being recorded and preserved until the final stage of presentation for a certificate arrived. The child's progress through school was, of course, not normally influenced by the test scores. Promotion and classification (or re-classification) depended solely upon the child's actual performance in class.

But when progress was poor and a practical problem of guidance arose, it was found helpful to consult the results of these special tests. In a surprising number of cases the developing, and now marked, weakness in Mathematics or in Language study or in English was clearly forecast in the test scores. So much so, that long before the accumulated results of six years were available for this report, considerable insight had been gained into the significance of the test scores, and complete confidence had been established in any advice based upon them which might be offered to parents. The results are given in Appendix I, but the outstanding details are summarised here. Their significance is strengthened by comparison with the results of a similar study carried out in Birmingham.

Through the courtesy of the Director of Education and with the co-operation of the schools concerned, the four tests were given to pupils admitted to Birmingham secondary schools in September 1937. Recently the marks obtained at the School Certificate Examination in 1941 by those pupils who completed the four years' course were compared with the test scores obtained in 1937. The results are also shown in Appendix I.

There is a considerable degree of similarity between the English results and the Scottish ones, in spite of the different length of the school course. There are some points of difference also, notably the lower Birmingham scores in the tests, but these are related to the fact that the mean age of the Birmingham children was seven months less than the mean age of the Scottish children.

The point to remember in examining these data is that the tests were given when the children entered the secondary school; the results were then largely, if not entirely, ignored. Four or five years afterwards they were again studied to see what connection, if any, there might be between the test scores and the marks in examinations. It would be foolish to imagine that the 'order of merit' of the pupils at age eleven would, or should, correspond closely or fairly closely with the order of merit in the Certificate examination or with the order of merit in class four years later. Considering the vagaries of examiners and examinations (quite apart from all other variables), it would be too much to expect a high numerical correlation between the two sets of data. Nevertheless, most of the correlation coefficients which were calculated were reasonably high and statistically significant.

The results given in Appendix I are not, therefore, reported in terms of correlation coefficients. The important fact for our purpose is whether the pupil on entering the secondary school can obtain such a score in the test that there is a high probability of reaching the standard of attainment represented by the certificate; or, conversely, whether he obtains such a low score in the test that the prospect of his successfully completing the course is a very remote one. Hence, the significance of each score must be ascertained, and this is best expressed in terms of probability. In the Words test, for example, the child who scores 120, whether in England or in Scotland, is ' practically certain ' to be successful, since only 1 failed out of 200 or more pupils. The significance of a score of 106 and over is in England almost as great, but less so in Scotland. Again, the child who scores between 90 and 105 in the Words test has seven chances in eight of being successful; whereas one whose score is less than 85 but more than 75 has only about one chance in two, or one chance in eight, according as he belongs to a ' Certificate ' group or to a ' randomly selected ' group.[1]

If, therefore, we desire to advise a parent we should be safe to recommend the course for a School Certificate, so far as English Language is concerned, for a pupil who could score more than 105 in the Words test, and perhaps also for one who scores over 90, though we should have to recognise that in the latter case we are including a small number of ' potential failures.' But with those who score below 90 we should have to proceed with caution. We should first look in other directions for confirmatory data regarding ability (or lack of ability) for English Language. Some indication can usually be found from an analysis of the school record, but, should it not be forthcoming, we should turn to the results of the other tests to consider what are the probabilities of success in other subjects. We might find that the hope of a pass is slight in all subjects (surely a safe ground for guidance), or we might find that a certain pass in English Language is a certain fail in Mathematics and only a doubtful pass in Science (a common and a difficult problem). Again, we might find that the pupil has two strong abilities and two weak ones, that his chance of obtaining a certificate is nil (because passes are required in all or nearly all subjects), but that he is likely to be an outstanding pupil in the two subjects in which he has potentialities. How are we to advise such a pupil or, from the pedagogic standpoint, how are we to provide for his further development to the best advantage? Should we advise him to try the Certificate course (knowing he will fail), or should we so organise our teaching arrangements that the fullest possible opportunity is given for the child to develop his talents without the discouragement associated with failure?

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[1] The difference between these is explained in Appendix I, p. 165.

Few schoolmasters have dealt with these problems really effectively because they have not known the true nature of the problem, but now that means and methods are available, surely the educational guidance of tomorrow will be more soundly based and more effectively applied.

It will be realised, of course, that the data given in some of the tables refer only to pupils accepted for admission to secondary schools under current promotion procedures. The pupils are therefore selected (in some cases highly selected), and therefore the number of 'border-line' cases is small. That is why the chance of success in the case of a low score (in the Words test for a score of less than 85) seems disproportionately high. When, however, the pupils who fail to gain admission to a secondary course are similarly tested, the great majority (85 per cent.) obtain the lower scores. Their inability to complete a Certificate course is implied not only by their previous record, but by their record in the less difficult post-primary courses in which they are usually to be found. Consequently, if we add these to the numbers who fail, we find that the significance of a low score (as a fail) approximates more nearly to the significance of a high score (as a pass). In using these tests with unselected school populations, therefore, a low score is much more likely to indicate a 'fail' than a 'just possible pass.' Nevertheless, every pupil whose score falls within the limits indicated by the probability figures will require special consideration in the light, not only of the test result, but also of other available data (cumulative records or otherwise), and especially, as noted in Appendix I, of the probable length of school life, with its related incentives.

Is it not rather astonishing that one short test taking from half an hour to an hour should possess such definite prognostic value in regard to an examination to be taken three or four years later under such different and certainly more exacting conditions? And are not the implications of this fact worthy of serious consideration?

A notable feature of these data is that they seem to be relatively independent of age, though this is not strictly true of *all* the individuals examined. The mean age of the children attending English schools was 11 years 7 months (S.D. 7 5 months), whereas for children attending Scottish schools it was 12 years 2 months (S.D. 6 months). When the score distributions of age groups differing by 3 months were studied, it was found that increase in score with age was slight (and mainly in the younger age groups). In the Scottish schools there was even a decrease in score (notice the higher mean age and smaller deviation).

This result suggests that when the procedure of selection for secondary-school courses has produced a reasonably homogeneous group, the scores obtained in these tests by individual children are not appreciably affected by influences attributable chiefly to *duration* of experience, as registered by chronological age. Accordingly we are all the more justified in believing that the test scores are an indication (with varying degrees of certainty, as the tables show) of abilities, innate and acquired, which have not only contributed effectively to the level of attainment already reached, but which also are likely to be the chief determining influences in the level of attainment in cognate subjects shown by the individual at a later stage.

It is important, however, to note with what groups the data reported in Appendix I were obtained. In applying the same tests to other groups the validity of any conclusions drawn therefrom will depend upon the existence of a reasonably constant relationship between the conditions in which the tests were experimentally developed and the conditions in which they are being used. If the examination standards used as the criterion of success were to vary from place to place and from year to year, much less reliance could be placed upon the results than these studies would indicate. In so far as the results themselves are sufficiently similar from year to year and from place to place, we may have confidence in them when we know that the general circumstances in which they are being used satisfy these conditions.

Accepting, then, this evidence of the prognostic value of such tests when used with candidates for admission to a secondary school, what would be their purpose? Would they supersede or supplement other measures of the child's fitness for promotion?

It has already been suggested as a guiding principle that the methods of selection should be as accurate and as economical in time and effort as possible. Therefore, to be of most value such tests, improved as and where necessary, must ultimately be good enough to supersede our present methods of selection. But until such time comes, it will be better to use them to provide evidence supplementary to that obtained in other ways and, in particular, to throw further light on the composition of the child's abilities, for, after all, this is our chief need at this stage of his education.

The observed high degree of correlation between the mental ratio and the 'all-roundness' of attainment required in Certificate examinations also justifies the inclusion of an 'intelligence' test, so long as the examinations which serve as the criterion of scholastic success continue to stress this aspect. But it is to be hoped that a more drastic revision of the Certificate examination will be undertaken when the raising of the school age brings into the secondary school a larger number of potential candidates. We have already seen that under existing conditions many of the pupils admitted to secondary courses fail to reach these 'all-round' standards, and it is very probable that scarcely any of the additional pupils will succeed in doing what these have failed to do (even allowing for existing errors of selection). As our need to differentiate between children's abilities according to their *kind* as well as according to their power becomes ever stronger, so does the value of an 'all-round' measure become progressively less.

The inclusion of measures of attainment in school subjects (usually English and Arithmetic) in the procedure of selection is usually justified by the need to be sure that each pupil has acquired the knowledge and skill necessary for the successful understanding of more advanced work. These same measures, however, also provide some evidence of ability and so might be expected to show a more or less close connection with the child's subsequent success. Yet in actual practice the degree of connection has seldom been found to be high, and many errors of classification have occurred when promotion to secondary courses has been made solely upon the results of such examinations. The opinion generally held for some time has been that these examinations are so subject to diverse error-creating influences that their results cannot be relied upon, and that their prognostic value is not really high enough for independent use.

In opposition to this opinion must be set the recent findings of McClelland and his assistants, in their report on an investigation into the problems of Selection for Secondary Education sponsored by the International Examination Inquiry Committee.[1] In the school year 1935–6 they examined over 3,000 'qualifying' children in the primary schools of Dundee and later traced the scholastic records of the same children until they left school or until they reached the Junior Certificate stage. The whole inquiry was planned with extreme care and the report gives a remarkably complete and exhaustive analysis of the data obtained.

[1] McClelland, *Selection for Secondary Education*, 1942 (Univ. of Lond. Press, Ltd.).

The 'measurements' taken while the children were still in the primary schools were:

(*a*) An intelligence test (a Moray House Test).

(*b*) Standardised tests of attainment in English and Arithmetic (Moray House).

(*c*) A 'qualifying' examination in English and Arithmetic (prepared by the Director of Education on lines then usual in Scotland).

(*d*) Teachers' estimates of the child's attainments in the primary-school subjects expressed in percentages and scaled to a common standard.

(*e*) Head teachers' estimates of health, ability, personality and general attainment expressed qualitatively by ratings on a five-point scale.

The criterion of successful work in the post-primary stages was a composite mark derived from *all* the subjects studied, including Art, Music, Handwork and Physical Education, as well as the usual 'Certificate' subjects (Latin, Modern Language, Mathematics, Science, Geography, History and English). Great care was taken to obtain reliable and comparable marks. Nevertheless, the investigators report that they found "the marks of the classes in the same course in the same school comparable, but that the standards, as between school and school and as between the different courses in the junior secondary schools, could not be regarded as comparable."[1] The significance of this in a research is obvious, but it is just as important that in our educational administration we should not ignore such variations. On the other hand, the recognition of their presence does not justify the view that no generally valid procedure of selection can be arranged.

Having eliminated, or allowed for, the various sources of error inherent in an inquiry of this magnitude, the investigators found that, of the separate measures used by them, the best predictive value was shown by the 'qualifying examination.' Next in order came the scaled teachers' estimates, then the standardised tests of attainment, and finally the intelligence test. (It will be observed that the criterion is also a measure of scholastic achievement, albeit in different subjects and at a more advanced stage. In this connection it may also be noted that the qualifying examination papers were marked by the same experienced examiner and that the English paper contained questions on grammar and word meanings which could be marked objectively.)

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[1] McClelland, *op. cit.*, p. 53.

Combined into a battery, the best combinations of these measures for predicting success at the post-primary stage proved to be those in which the qualifying examination was used. The best combination was made up of the qualifying examination, the scaled teachers' estimates and the intelligence test (expressed as a mental ratio). The addition of the standardised attainments tests made practically no difference to the predictive value of the battery (because, in the view of the investigators, it was measuring the same things as the other two scholastic components).

Although the qualifying examination found such a prominent place in the results, the investigators were not enthusiastic about its permanent inclusion in their recommended procedure and they suggested that selection might be as effectively based upon the intelligence test and the scaled teachers' estimates, provided these measures can be strengthened by—

> (*a*) " improvement of teachers' standards of marking, for example, by encouraging them to make more use of standardised tests ";
>
> (*b*) " the replacement of present intelligence tests by some kind of composite test which, while including English and Arithmetic, would be free from the evils of external examination." [1]

The general agreement between these recommendations and the point of view already developed in these pages is encouraging, but it is to be regretted that the investigators did not have time or opportunity to discuss the second suggestion more fully.

Valuable though the Dundee research is and important as are its findings, the fact remains that the main purpose of the inquiry was to validate a selected composite procedure against a criterion representing the ' all-round ' concept dominant in the secondary schools. When the investigation was first planned, there was perhaps no particular reason to doubt the suitability of this criterion, and, certainly, so long as it prevails, the selection procedure must be validated by it. But it seems a pity that the searching analysis of the minimum marks and the border-line cases of this report was not extended *to the differences in the achievements of individuals from subject to subject.* As regards the treatment of border-line cases, the investigators clearly believe that the application of a pass-mark selected to yield the minimum error should never be applied rigidly, and that there are always other associated facts which, if taken into account, will increase the accuracy of the forecast.[1] Many of the profiles used to illustrate the errors of prognosis show significant differences among the various measures upon which selection would have been based, and it is regrettable that the profile representing the scholastic success of the individual shows only his *average* progress (for all subjects combined). It is probable that a similarly detailed profile for progress in different subjects would have thrown further light upon the real nature of this selection problem.

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[1] McClelland, *op. cit.*, p. 170.

This averaging of the marks of the individual over a group of subjects in which many different abilities, skills and attainments are demanded, may also explain why the qualifying examination shows such a high prognostic value in this particular research. The differences in the ability of the individual from subject to subject have been smoothed out. Such a smoothing will give a similarly high correlation with an intelligence test when the subjects that are combined involve verbal or intellectual rather than practical or manual processes. In this instance, however, Handwork, Music and Physical Education have been allowed to contribute to the composite mark, and it is therefore possible that the correlation with intelligence has been reduced without any appreciable alteration in correlation with the qualifying examination.

Be that as it may, McClelland's recommendations for the selection of secondary-school pupils are valid only so long as we accept the criterion as a desirable one. The chief objection to it is that even if the errors are reduced to a minimum by these special techniques, the basic *causes* of the errors remain unknown. Moreover, since there is only one objective—a high average school mark—the classification of pupils for selection is inevitably determined by their average score in the admission examinations. Thus McClelland recommends [2] that no pupil should be considered fit for a senior secondary school whose score is less than + 0·66 of the standard deviation, and that no pupil should be considered fit for a two-language course whose score is less than + 1·39 of the standard deviation. While these distinctions are undoubtedly well founded and the techniques recommended admirable in themselves, their practical application to the selection problem implies those successive 'creamings' of pupils to which objection has already been made.

This procedure seems to take for granted that the secondary schools of the future will be similarly stratified and that education authorities will want to differentiate between their schools and their pupils solely according to their ranking in the admission examination. The fact that in many schools at present such distinctions form the main basis of organisation should not induce us to forget that in the long run this may not be the most successful way of solving our selection problem. But since the complete answer obviously depends upon whether we are organising for a multilateral school or for separate schools of different types, it will be well to turn now to the discussion of this aspect of the question.

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[1] See Appendix I, pp 169 to 175.

[2] McClelland, *op. cit.*, p. 240.

Accordingly, this part of the discussion will be appropriately completed by an outline of the kind of individual inventory which will be required by the educational adviser, whether his task be to direct pupils to different schools or to parallel groups within the same school.

INDIVIDUAL INVENTORY

The personality assessments and the measures of ability and attainment should be set out for each individual in a systematic way thus:

A. Personality (rated on a graphic scale. A mark is made along the line according to the amount of the trait possessed. Half-way along the line represents an average endowment).

(*a*) Qualities underlying social ability	(1) Sympathetic	Unfeeling
	(2) Modest	Ostentatious self-display
	(3) Co-operative	Hostile
	(4) Obedient	Rebellious
	(5) Conscientious	Untrustworthy
(*b*) Qualities underlying executive ability	(6) Self-assertive	Submissive
	(7) Self-reliant	Requires encouragement and support
	(8) Fearless	Apprehensive, timid
	(9) Remains calm (when pressed)	Makes mistakes more easily
	(10) Ambitious	Unambitious
	(11) Self-disciplined	Self-indulgent
(*c*) Qualities underlying efficiency in practical activities	(12) Persistent	Soon gives up
	(13) Consistent	Variable
	(14) Energetic	Lethargic
	(15) Industrious	Lazy
	(16) Careful and painstaking	Careless and untidy

B. MIND (expressed as a percentile or as a standard score).

(*a*) Understanding of and memory for *verbal relations*	(1) Word-meaning tests
	(2) Paragraph-meaning tests
	(3) Reading exercises (for meaning)
	(4) Sentence completions
	(5) Grammar exercises
	(6) Composition exercises
	(7) Recitation exercises
	(8) Word forms and spelling exercises
(*b*) Recognition of and memory for *attributes*	(9) History exercises
	(10) General knowledge tests
	(11) Nature study and hygiene exercises
	(12) Geography exercises
(*c*) Grasp of *causal relations*	(13) Reasoning tests
	(14) Picture completion and similar tests
(*d*) Comprehension of and memory for *number relations*	(15) Arithmetic problems (mental, written)
	(16) Arithmetic rules (mental, written)
	(17) Geometrical shapes (problems)
(*e*) Perception of and memory for *spatial relations*	(18) Formboards
	(19) Constructional or manipulative problems
	(20) Drawing (accuracy of perception)

C. BODY.

(*a*) Dexterities of hand	(1) Drawing (quality of control of tools and media)
	(2) Handwork (quality of control of tools and media)
	(3) Writing (speed and quality)
(*b*) Dexterities of voice	(4) Speaking (clear and good enunciation)
	(5) Singing (tone quality)
(*c*) Dexterities of body generally	(6) Miming (expression)
	(7) Dancing (grace of movement)
	(8) Physical exercises, games (skill of movement)
(*d*) Physique	(9) General bodily development
	(10) General bodily fitness

CHAPTER IV

GROUPING FOR INSTRUCTION. THE MULTILATERAL SCHOOL

HAVING established sound and practical methods of exploring, assessing and recording the abilities, attainments and temperaments of the child at eleven plus, we must next decide how to make the best use of them. This involves a determination of the *nature* of the particular curriculum through which appropriate educative influences can be provided for each individual child, and an examination of the vexed question of *grouping* the children at eleven plus into convenient school units through which these influences may operate. The latter problem is an awkward one because of the ' vested interests ' of existing school groups and the strong prejudices associated with them, but the discussion in this chapter may help to place them in clearer perspective. It will be convenient to discuss the grouping problem as if it concerned the administrator alone, though it is obviously as important to teachers and pupils as are the related questions of courses of studies and methods of instruction.

Since the Scottish Education Act of 1936 it has become the universal practice in Scotland to describe as secondary—but distinguishing between junior and senior—all forms of education which follow a primary course. It must, however, be confessed that the diverse provisions under this general head are not yet regarded, as they should be, as of equal merit or importance, and it is to be regretted that almost everyone—pupils, parents, teachers and even administrators—consider a course of study which includes a foreign language as better and more to be desired than one without. The consequence is the wastage already described, for which the figure of 40 per cent. is a conservative estimate.

In England, as yet, this broader view of secondary education has still to gain acceptance, for in a recent questionnaire the Board of Education asked " if it is desirable that the term ' secondary education ' should be enlarged in scope to include three main types of education, namely, the grammar-school type, the modern-school type and the technical-school type, it being understood that the grammar school has, as its main objective, the preparation of pupils for university, profession or business careers."[1] The universal practice was, as in Scotland until quite recently, to apply the name ' secondary ' solely to the grammar-school or the high-school type of education, and although some schools of other types were modelled on similar lines, there could be observed a growing tendency to emphasise and to increase the differences in aim out of which they had originated. It is doubtful whether the resultant effects can be considered wholly satisfactory, in view of what has been said about the customary methods of deciding admission to the various types of school.

Here, indeed, is the crux of the whole matter. In organising the secondary-school population of any town or district into suitable school units, do we wish to perpetuate these existing types or to increase their number or to modify their characteristics? Do we wish to abolish, as unnecessary and even harmful, many of the distinctions, social, economic or vocational, which have given rise to them, and, in the future, to reorganise them into units of a more uniform type, free from the anomalies which abound in the present arrangements?

In considering this matter, let us not adopt too readily the typical administrative point of view. The education officer wants a simple answer, for his committee dislikes complex and involved problems. He favours a neat and tidy organisation, one with clear-cut distinctions easily understood and capable of being operated without complex or costly administrative machinery. He thinks of the children to be educated rather in the abstract, as so many units to be sorted, labelled (by rubber stamp) and provided for in the most economical and time-saving way. Being genuinely impressed by the results of the Dundee investigation he will, if he has not already adopted a similar method of classifying them, distribute pupils among the available schools according to their ' standard ' score in the admission examination. By so doing, he will establish new, or re-enforce old, distinctions of status between school and school, even when no social or economic factors are allowed to intrude, and he will encourage or strengthen those differences of aims and methods which have always made it difficult, and may even render it impossible, to rectify any errors in the original classifications which may subsequently be discovered. Moreover, staff selection problems will take on aspects not generally favourable to the interests of education as a whole, for, rightly or wrongly, the training of the teacher is affected by these differences, while his outlook and further development as a member of his profession are considerably influenced by the status and nature of the school in which he works.

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[1] The White Paper outlining the Government's proposals for an Education Bill implies that the answers were in the affirmative.

Rather should we give careful consideration to the view of the educational adviser who is concerned with each child as an individual and who, in order to satisfy many diverse needs, desires the maximum of flexibility in the school organisation. He, too, would like a simple solution, but he recognises that, even with the most improved methods of psychological examination, he cannot satisfactorily arrange children in the over-simplified categories of A, B, C or D. He knows that many children graded B by the Dundee and similar methods will differ very little from children graded A and may, in some aspects of human endeavour, be actually superior. He believes that in certain environments children graded C or D will give an excellent account of themselves in activities of suitably restricted scope, and he would like to see these special aptitudes provided for. He desires a school organisation in which the continuous and progressive development of each child will be ensured by the provision of educational media in which he can develop happily and by the *exclusion* of any other media which, however suitable to other natures, are not appropriate to his.

Observation of existing conditions in many schools does not encourage a belief that the segregation in separate schools of pupils of common aims (with or without common abilities, for both types of selection occur) will produce this result so often or so completely as will the congregation, within one school, of pupils whose varied aims, ambitions, abilities, interests, tastes, temperaments and characters reflect those of the community to which they belong. But although good claims can be made for both points of view—and it is obvious that there can be no standard solution to the varied problems of different localities—nevertheless it is worth while to consider the implications of a method of grouping by ' vertical ' rather than by ' horizontal ' division.

Suppose all the children of approximately the same age (eleven, say, but not yet twelve) in a town or district who have completed the primary stage of education are arranged, according to their abilities, in a heap or mound with the best at the top. The usual division by examination into groups of A, B, C or D pupils is like cutting slices off the mound parallel to its base. If, however, the slices are cut vertically, each will contain a proportion of each kind of ability. A school formed in this way would constitute a representative sample of the community as a whole; indeed, in sparsely populated areas, being the complete mound rather than a slice, it would comprise the whole juvenile community concerned. In contrast, any school formed by horizontal division must always be limited by more or less artificial considerations, whether it be designed to serve local needs or national ones, and accordingly must tend to encourage many mistaken ideas regarding the individuals who compose it. Such ideas exist, even now, concerning the selective schools with which we are familiar; they would be aggravated and intensified if the slices were made thinner, for that is what some current suggestions for refinement in selection would imply.

Among the advantages that may be urged in support of the ' selective ' schools are:

(1) *Homogeneity,* in its various aspects—social (as in the more expensive private schools), intellectual (as in those which impose entrance examinations of high standard), and vocational (as in junior technical and commercial schools).

(2) *Simplicity in organisation and internal administration,* for there is usually one standard ' diet ' and one form of ' service.' The chief remedy (there are others) for the ' indigestibility ' of the food is a reduction in the quantity rather than a change in the menu. True, the diet can be ' enriched ' for selected individuals, but the main service is from the common ' pot.'

(3) *Definiteness of aim*—university, profession or business—with its related incentives. Even though the *ultimate* aims are diverse enough, they have a common foundation in that they have to be entered by the same narrow gate—School Certificate or Matriculation. It is considered wise to concentrate on getting through this gate, and this becomes the main objective of all concerned.

Homogeneity in grouping simplifies the teachers' problems and promotes instructional efficiency. It should, and does, occur among the *sub-groups* of any school, selective or otherwise, but when it is applied to the determination of the main group—the school—there are certain dangers. Schools which specially prepare for one particular vocation are liable to develop a ' lopsided ' outlook, while those whose members pride themselves on their social or intellectual exclusiveness are not likely to be appreciated in a truly democratic community, however good a case can be made out for them.

Simplicity of organisation is always desirable and will be sought for assiduously by every administrator, but it can be purchased at too high a price. An impartial critic of the twentieth-century grammar school or high school is bound to condemn the widespread tendency to conform to one standard pattern, for in this conservatism it has evaded some of the vital and pressing problems of our day. If example be needed, the position of Latin in many schools is sufficient.

Definiteness of aim is always helpful and should be sought for, no matter what the type of school happens to be. But it would seem to be a mistake to seek this by 'canalising,' as it were, the stream of youth into three or four main channels. Surely there are better ways of securing the motivation arising from definiteness of aim without limiting it artificially by school selection procedures?

One form of organisation based on a vertical division of the child population can be seen in the 'omnibus' school, a name which reminds us of a public-service vehicle in which there are no reserved seats; for indeed such a school not only renders a notable public service to the community, but excludes none except those ineducable ones who are incapable of climbing on to it. The name 'multilateral' is perhaps more descriptive of the characteristic features of such a school, but in using it we must remember that this term does not necessarily imply an unselected group of pupils. It can, and indeed to some people may, suggest a selective school in which there is a high degree of differentiation between courses of study, within the ranges of ability provided for. In such a case the categories by which the pupils are classified have a meaning quite different from those implied above by the letters A, B, C, D.

A 'multilateral' school will be defined here as one which seeks to provide for the diverse aims, interests and abilities of all or most of the children in a typical community without any reference to such social, economic, intellectual or religious differences as may hitherto have governed the organisation of existing selective schools. Its immediate aim will be to launch, for each individual child, the frail 'argosy' which carries his 'capital' for investment, namely, his natural endowment and his acquired skills (see pages 68, 69), upon one of many streams of endeavour which converge, diverge or flow parallel to each other within the broad boundaries of the school's activities. Its ultimate aim is the highest possible 'wealth' of each one expressed in the happiness and contentment that springs from doing worth-while things in a satisfying way.

The main advantages claimed for this kind of multilateral school are:

(1.) That it removes all the complications of status and makes it possible to plan an educational system on a truly democratic basis.

(2) That it makes possible a greater variety of educational media and so enables the educational guidance of the child to be more effectively carried out.

(3) That it overcomes the problem of the wrongly classified pupil, because transfer within the school is easier to arrange than transfer from one school to another.

The importance of these points needs no emphasis, but some misconceptions about the last should be removed. Transfers from course to course do not as a rule win the approval of parent and child more readily because they are within one school. Opposition to a change of class is often as great as if a change of school were being suggested. Indeed, in some cases the latter proposal, especially to a school nearer the child's home, is much more to the parent's liking. We must recognise that ideas of 'prestige' arise just as readily about differentiated classes within the same school as they do about different schools within an urban area. Even in schools where the pupils belong mainly to one social class, differences are thought to exist between class-sections (the higher naturally being preferred to the lower), and similar ideas are more intensely held in a multilateral school when it is believed, falsely or not, that the class groups correspond to social as well as to intellectual or vocational differences. The transfers to which most objections are taken are, of course, those which involve a change to a less ambitious programme of work, or a 'de-grading,' as the parent regards it; for although the aim is to get everybody to regard all the available alternatives as of equal status, it is not easily attained.

Objections to changes of the opposite kind seldom occur, chiefly because, in most schools, the errors of classification on admission are predominantly of inclusion rather than of exclusion. But they are not unknown in a multilateral school, being usually from pupils of ability who prefer to continue to associate with those leaving school at fourteen rather than to embark on the more ambitious projects of other groups. This is not a manifestation of 'social' influences as such, though it is certainly influenced by the circumstance that many of the child's companions at the primary-school stage are to be found in the group which the child is invited to leave. Again, unwise requests for transfers to more ambitious programmes of work in which former companions are already enrolled are similarly founded on comparisons and associations derived from the primary school, without any reference whatever to the child's capacity to compete on equal terms at the higher levels. Sometimes the erroneous ideas behind these requests are difficult to remove.

Most of the objections levelled against the multilateral school seem to have arisen from existing prejudices. Many are 'social' in origin; the parents who complain that the school is 'horribly mixed' are fairly numerous in some areas. But this attitude may, and often does, lead the objector to project his dislike on to other aspects of school life. The efficiency, aims, organisation and even the methods of the school come in for criticism, chiefly because the objectors do not wish to understand what the school tries to do, and consequently fail to appreciate what it succeeds in doing. Comparisons are made with selective schools to the advantage of the latter, for it is usually the parent who desires the 'exclusiveness' of a fee-paying school who objects to the local high school abolishing its fees and throwing open its doors to all comers.

There is no ground for believing that a multilateral school because of its wider interests and more numerous problems must necessarily be less efficient than a selective school which concentrates on a narrower range of activities. Given competent staff and pupils of equal calibre, there are seldom any significant differences in the *comparable* results, whether these be the test of examinations or of success in after-life. Such differences as there are spring from the wider aims of the school and may prove to be highly desirable ones.

It is difficult to give an impartial account of the working of an organisation for which one is personally responsible, but it will add force to many of the statements of this chapter to describe the actual operation of a school which has been working on a multilateral plan for more than thirteen years. During this period there were occasions when the 'wave' of the high-birth-rate years which followed the last war swept through the secondary schools, periods of economic depression and of trade recovery, years when children found employment difficult to get and the Juvenile Instruction Centres then set up provided, for some, a more attractive form of education than the multilateral school of that day could give, and, finally, years when employment became so abundant for the fourteen-year-old that the force of the usual inducements to continue longer at school was seriously diminished. All these varying influences affected the organisation in one way or another, especially through the attitudes of the children to school and to employment, to the choice of a course of study and to the length of their life at school. Some of these influences are seen quite clearly in the variations from year to year shown in the tables of Appendix I.

The school came into being as a multilateral organisation by the decision of the Local Authority. Previously it had had a long history as a fee-paying selective school, but during the ten years preceding the 'appointed day' fees had been abolished and certain changes had taken place in the number and place of residence of the children who attended the school, though not in its aims, organisation, staffing and equipment. A large and well-equipped new building was now erected adjacent to the old one, and when it was ready some 450 'Certificate pupils' of the existing high school found their numbers increased by the arrival of some 550 'other pupils' who had previously received their advanced instruction in the primary schools of the district. With them came the teachers who had previously conducted this advanced work.

Unfortunately, owing to the fact that the additional buildings were equipped for technical and evening continuation classes, a confusion in nomenclature developed in the minds of parents, with the result that the pupils of the former organisation were referred to as 'high school' pupils, while the newcomers were described as 'technical school' pupils. Whether parents chose to emphasise this distinction deliberately or purely through ignorance, it is impossible to say, but it is a fact worth recording that it took years to get it generally understood and accepted that the enlarged high school was a *single* organisation with a number of different, but interrelated, departments.

Hostility was shown to the new organisation both by parents and by teachers. It appeared in its extreme form in the removal of certain children to fee-paying schools in other districts. This was not a new phenomenon. It had become fairly common after the abolition of fees, but the centralisation of the 'other pupils' certainly increased it, at least for a time. It was said that the school had lost 'prestige' by opening its doors, and some parents professed to dislike having their children *mix* with those who were less fortunate in their home circumstances and whose standards of speech and manners were not as high as those of their own children. Such statements were quite at variance with the facts, for, as will be seen from Appendix II, the necessary classifications by length of school life as well as by ability produced class groupings much more homogeneous, socially and intellectually, than any existing in the primary schools from which these children came. But the democratic ideal in education was not receiving much support twelve years ago and it has required the present war to bring its significance into clearer focus. Even so, the prejudices which were originally very strong have not yet disappeared. The number of pupils who sooner or later transfer to selective schools elsewhere remains fairly constant. Some go direct from the primary schools; others attend the free multilateral school for one year, sometimes for two, because the parents think, rightly we hope, that the quality of the instruction given is as good as it is anywhere else, but sometimes, we are afraid, *only* because they think the child too young to be travelling daily a considerable distance. In either case, the absurdity of any prejudice against the school and its wider aims is clearly demonstrated by such procedure.

Teachers, too, have been slow to appreciate the multilateral ideal. It was not a creation of their developing experience; rather was it thrust upon them from above, and they did not like it any more than did the parents. In this particular instance, the bringing together of two sets of teachers who, up to that time, had thought of themselves as belonging to two quite different spheres of scholastic endeavour, created a situation not conducive to complete unity of aim and outlook. Certainly, it did not take very long to secure unity, or to convince the staff that each had something valuable to contribute to the well-being of the organic whole. But it must also be said that teachers accustomed to the academic tradition seemed to find it difficult, perhaps because they had no strong desire, to adopt the wider point of view, and that most of them, if their preferences could have been given full rein, would have occupied themselves entirely with the 'Certificate pupils,' leaving the 'other pupils' to the care of whoever wished to specialise in their problems. So long as this attitude exists among teachers and so long as the idea continues to prevail that one form of promotion is to teach 'Certificate pupils' instead of 'other pupils,' the aims of the multilateral school will not be fully achieved.

There is, however, every reason to believe that these and similar difficulties, which seem to have occurred wherever multilateral schools have been established, are no more than the 'growing pains' of this newer organism. It is probable that future generations of parents, accustomed to this form of school organisation, and understanding it better than they do now, will regard it as the most natural way of educating the youth of the nation, and it is to be hoped that the better training of teachers will also in its turn produce a different outlook and result.

It was said above that a multilateral school ought to be truly representative of the community which it serves, but it is probable that few of those in existence today completely satisfy this requirement. This particular example, as already mentioned, began as a ' selective ' high school, to which pupils came from the burgh (population 44,000) and from surrounding districts for a radius of seven or eight miles. At that time all its pupils were supposed to be ' Certificate pupils,' though the data on page 55 show how erroneous this idea was. The pupils added in 1929 were of the kind referred to as ' other pupils ' (except a small percentage of unqualifiable ones), and were promoted from the primary schools of the western half of the burgh. The number of pupils in these two groups has varied from year to year, but the proportions have been fairly constant, there being, as a rule, rather fewer of the ' other pupils ' than of the ' Certificate pupils.' But it will be realised that the ' other pupils ' represent only half the town, whereas the ' Certificate pupils ' represent the cream of the urban and rural area combined. Consequently there is a higher proportion of ' Certificate pupils ' than there would be if the school were constituted, say, from the unselected school population of a smaller district. This should be remembered throughout the subsequent discussion and especially in regard to the class groups shown in Appendix II. Its effect is to increase the number in the ' Certificate group,' but it does not affect the nature of the organisation or the principles upon which it is based.

Each year's intake varies from 420 to 480 pupils, divided approximately equally as to sex. The intake is usually spread over two and sometimes over three terms, but there is, as yet, no settled policy in regard to this. Different arrangements have been tried, but conditions have been so variable that no final conclusions have been reached. For the present, however, most of the ' Certificate pupils ' are promoted only once a year.

Of the total number admitted in any year, about one-third are accepted for linguistic courses extending over at least three years, while a further fifth commence commercial and technical courses of the same duration and difficulty. The remainder, rather less than half, intend to leave school as soon as possible and are provided for by means of technical and practical courses (boys) and domestic and craft courses (girls). The school has no primary department.

Various disturbing influences have caused the total roll to fluctuate between 1,020 and 1,295, so that the organisation problems, affected as they are by changes in numbers, staffing, certificate regulations, etc., have never been stable for two successive years. Considering how the needs of the class groups vary from year to year as the individuals composing them pass through the school, it seems highly improbable that it ever will become stable in the sense that detailed arrangements made in any year will be applicable in the next.

The pupils on admission are classified broadly into the two main categories already mentioned—'Certificate pupils,' who study a foreign language or, if not, whose other work is of the same standard, and 'other pupils,' who leave school at the earliest possible moment. This classification is based upon decisions regarding promotion made by the education officer upon data provided by the primary schools. It is modified only when supplementary information becomes available either through special tests, such as those described (page 59), or by teachers' reports (secondary stage), or from interviews with parents.

It has been suggested by some that the inevitable errors in this preliminary classification can best be dealt with by providing a common course during the first post-primary year, but the authors of such a proposal must be thinking only of Certificate pupils. These could, it is true, be made to follow a common linguistic course, but as it is clear that the time spent on language study by 40 per cent. of these would be wasted, this does not seem to be a sound way of dealing with the difficulty. Similarly, for other pupils, the common course would be unsuitable in every respect and not merely in regard to the inclusion of a foreign language. The abilities and attainments of these pupils are not such that they *can* benefit from a course which suits the Certificate pupils. In English, for example, the books which the latter can read with profit are almost invariably too difficult for the former. Nor would it be wise to lower these requirements merely to suit the less capable pupils.

Evidently, then, differentiation is needed *from the outset.* Whatever errors there are in the results of the admission examination, they must remain until they can be discovered and removed by whatever means are at the head master's disposal. But all other considerations compel us to differentiate in regard to the subjects to be studied, in regard to the ways in which they are studied and in regard to the standards we expect the pupils to reach.

Not only must the class divisions formed on entrance have an intimate connection with the known variations in the ability, aims and length of school life of the pupils, but, because effective transfer from one division to another becomes less and less easy the longer it is delayed, our primary endeavour must be to discover these errors and not to wait until they reveal themselves.

It may be assumed that the subdivision of pupils will normally be into 'classes,' though there are other ways of dealing with this problem which will be discussed in a later chapter. But so long as instruction is organised on a 'class' system and each day's work is parcelled out into portions of convenient size and variety, the best arrangement is undoubtedly that which aims at securing groups that are homogeneous both as to abilities and as to attainment. Whenever numbers are large enough to permit it, classification by ability, rather than by age or by ambition, does ensure that the average progress of the individuals in each class group is not too slow for the quick ones nor too fast for the slow ones. The effectiveness of such a classification obviously depends, however, upon the accuracy of the gradings provided by the admission examination.

When this particular school became a multilateral organisation, the results of the admission examination were not reliable enough to give good class groupings, and for several years this information was supplemented by tests of intelligence given after the pupils had been admitted. Since 1936, however, the procedure throughout the county has been improved and the present practice (which depends upon an intelligence test and a scholastic attainment test, standardised at the time of examination by data obtained from all the children within a selected age group) enables highly homogeneous class groups to be formed.

This result is much appreciated by the teachers, though it may be questioned whether, from a wider viewpoint, it is the most desirable form of organisation; because, if *other factors* did not affect the problem, the direct consequence of applying these methods would be to produce within the multilateral school a stratification of intellect not materially different from that which would occur if the same children were distributed by the same methods among different schools. The *other factors* are those concerned with length of school life and vocational ambitions. How they have affected a classification by ability alone can be seen in Appendix II, which gives a list of the class groups in this particular school, and certain other useful data. The median mental ratio and the range of mental ratios for each class group show how the groups differ in ability as measured by an intelligence test. The median score obtained in a scholastic attainments test before admission and the range of these scores indicate how the groups differ in their basic educational background, for it may be assumed that the higher scores indicate more effective skills in the use of the mother tongue and in arithmetical calculation.

In the matter of 'wastage' the following comparisons are illuminating:

(1) One hundred and eighty first-year 'Certificate pupils' who begin to study a modern language are reduced to about 118 by the beginning of the third year, and to 70 or so by the end of it.

(2) Out of 284 first-year pupils entered as 'Certificate pupils,' not more than 90 may be expected to be still at school after the end of three years, and not more than 60 (about 20 per cent.) after the end of four years.

(3) One hundred and ninety first-year 'other pupils' are reduced to 16 by the beginning of the third year (and have all left by the end of one further term).

In regard to classification by ability it will also be observed that there is a pronounced overlap among the class groups both in the first year and in the second year. This is not due to errors in grouping by mental ratio, but is the result of taking into account the probable length of school life and the vocational aims of the pupils. It is convenient to keep together all those who definitely intend to attempt the Senior Certificate (at 16½ or 17½), even when the abilities of some of them are of the 'borderline' order. (See the range of mental ratios in groups 1 and 2, second year.) Yet there are difficulties in doing this. Some who will eventually attempt the longer course have no such intention when they are admitted; others, again, wish to leave the matter open; and others who profess certainty on entrance change their minds later. To allow for these contingencies necessarily interferes with a simple classification by mental ratio.

It would, in some respects, be more convenient to group together those whose school life is *definitely* to end at the Junior Certificate stage (14½ to 15½), for then suitable modifications in method and subject-matter could be introduced. But this cannot be successfully achieved if we attempt to safeguard the possible further promotion of those whose plans are still uncertain. The practical consequence is that many head masters take the Senior Certificate as the basis of their organisation and consider the Junior Certificate merely as a convenient half-way stage, at which some of the passengers in an overloaded vehicle may be advised to alight, while others, again, may be invited to wait for the next conveyance.

This particular solution of a complex problem is not as a rule inspired by any desire to find the easiest possible way out. Rather does it originate in the restrictions imposed by the Scottish

Education Department in its Certificate regulations. It is true that during the last ten years the Junior and Senior Certificate requirements have been broadened and that the Department has repeatedly expressed willingness to approve well-conceived proposals not in strict conformity with the published regulations. Nevertheless, the officers of the Department have not yet succeeded in interpreting this attitude in a sufficiently liberal spirit. They have considered it their primary duty to safeguard the standards of attainment which the Senior Certificate has represented with reasonable consistency for many years, and, therefore, have constantly endeavoured to ensure that the work of the final stages shall be based upon what they conceive to be sound foundations. For example, in order that a pupil not professing Mathematics at the Senior Certificate may be presented in a Domestic Science group of subjects, it is held to be necessary that she should have received instruction in Mathematics (including Geometry) throughout the first three years of the course. (Oddly enough, it does not seem to matter whether she *benefits* from the instruction, for she need never be examined in Mathematics at the Certificate stage, and will not be examined if, as she usually does, she drops the subject after three years). Similarly, a presentation in Biology is approved only when the specialised instruction in this subject follows a three-years course in general elementary Science *and* in Mathematics.

The reasons for these regulations are easily appreciated, but they seem to indicate that the officers who are concerned with the requirements of subjects do not sufficiently consider the needs of individual pupils or the general effect of such restrictions on school organisation. Yet it is clear that rules of this kind compel most schools to organise their Senior Certificate work on a common basis for three years, and to allow differentiation (as, and when, staffing and equipment allow), in accordance with abilities and ambitions, only when the preliminary stages have been successfully completed. It follows that considerable modification of the courses for the Junior Certificate cannot be attempted unless there are sufficient pupils to form suitable class groups and unless no complications will arise in regard to further education when that stage has been completed. These conditions apply in junior more often than in senior secondary schools, and in them there can be opportunities to modify and adapt which the smaller senior secondary schools do not care to attempt. But even so, when such pupils join a senior secondary school in the fourth year, they usually have considerable difficulty in adjusting themselves to the methods and standards of work required. It is not surprising, therefore, that in the senior secondary schools of Scotland the pupil groupings in the Junior and Senior Certificate courses are identical, while the ability and application of the successful candidates are practically the same for both.

In this multilateral school an attempt has been made to overcome the difficulty by classifying according to length of school life as well as by ability, and by not differentiating the *work* of the Certificate pupils as much as the differences in their abilities would warrant. But it is admitted that the results are not as satisfactory as one would like them to be. For example, among the first-year pupils there are two groups of 20 boys (5a and 11a, p. 186) whose general ability as shown by the mental ratios is equivalent and whose scholastic attainments are identical. They differ in that the members of the first group hope to stay at school until sixteen or seventeen, whereas the others want to leave at the earliest possible moment. (Behind this lies, of course, a very considerable difference in social environment and parental ambition, with results already noted in discussing the tables in Appendix I. Even with a considerable extension of free education and maintenance grants, such differences are likely to have important influences on scholastic efficiency and success.) Nevertheless, neither of these two groups of boys is being properly dealt with. The first group must be dragged at the heels of the language classes, since the schemes of work in all subjects must be related to the Senior Certificate standards, which these pupils, because they 'qualified' for an academic course, must be allowed to attempt. But it is just as certain that most of the boys in 5a will eventually drop out of the senior group as it is that the girls in 5b will want to change to a junior commercial course in the second year. The pupils of the second group, 11a, are brighter and more advanced scholastically than the 35 boys of group 8, but they will not work with either group 5a or group 8. If any of them are induced to join such groups, they soon want to return to the former class. The main reason seems to be lack of incentive, but, whatever it is, the effect of mixing them with Certificate pupils is never satisfactory and is sometimes disastrous. The antagonism to school work which overtakes the boy of this type between thirteen and fourteen is communicated to the Certificate pupils, and the class eventually disintegrates as an effective working unit.

This, then, in outline is the problem of the multilateral school of the present day. Its effective solution is hampered by the cramping effect of Certificate requirements on the one hand and by the disturbing influences of the early leavers on the other. Neither classification by ability nor by length of school life can be applied simply and directly in such an organisation. The school is, as it were, a multicoloured fabric with many intertwining threads tracing out their complicated patterns. Yet in this complexity lies the possibility of much greater satisfaction of individual needs. Indications have already been given of the measures needed to achieve this, and we can now see what the problem will become when the school-leaving age is raised.

First, for the Certificate pupils, uncertainty regarding length of school life is completely removed. If everyone has to remain at school until sixteen, the importance of completing successfully a Certificate course will now appear more important than ever before. Incentives, already strong, will be heightened, and better work will follow. But it must be noted that current wastage is due as much to the unsuitability of the courses provided as it is to the economic or employment conditions of the moment, and that there is considerable room for improvement.

Next, for all other pupils an entirely new situation will be created, and it is not only in the schools that a readjustment is required. Parents and pupils tolerated an elementary continuation of the education of the primary stage so long as the prospect existed of finding employment at fourteen. The inclusion of practical subjects giving a ' technical ' or a ' domestic ' bias has never, of itself, made these advanced courses sufficiently attractive to the pupils to induce them to continue longer at school, while the standard of the work done, having regard to the abilities of the children, has always left much to be desired. How are these attitudes to be changed?

In this connection it may be useful to point out that boys cannot be divided, either by mental ratio or by scholastic examination, into two distinct groups—those suited to language study and those suited to technical subjects. (It may be possible with more refined techniques of examination, but not with scholastic ones.)[1] It would be just as wrong to suppose that every boy whose M.R. is less than 106 must necessarily benefit from a technical course as it is to imagine that every boy whose M.R. is more than 106 will certainly benefit from a language course. Similar errors follow differentiation by scholastic attainments.

It is unfortunate that we have not, as yet, attempted seriously to deal with the borderline problems. Certainly, for boys, our categories have been too limited—and boys judged unfit for language courses have had, willy-nilly, to take technical ones. For girls, the position has been better in that a non-language commercial course provides a convenient alternative, its difficulty being intermediate between that of a language course and that of a domestic course. We must, however, as with the boys, guard against the error of thinking that these divisions correspond to particular levels of intelligence. The fact that they do in the main should not cause us to forget that there are many exceptions. In some schools, commercial courses for boys are provided, but it may be doubted whether this is an effective solution, inasmuch as the motive for taking such a course which develops in the boys' minds is usually a vocational one, and this may produce great disappointment when the boy later on discovers, as he often does, that his commercial course has much less 'market value' than he had hoped and expected. Vocational aims are not to be neglected or despised, but they should have a closer relation to employment conditions than some of the shorter commercial courses for boys appear to have had.

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[1] Selection for junior technical schools has for some years made use of non-scholastic measures.

Here then, for the multilateral school, the raising of the school age intensifies a problem which already exists, but which, because of the conspicuous shortness of school life at the secondary stage, has not yet been thoroughly examined. We may expect that the parent under the changed conditions will be encouraged, or compelled, to take a different view of the child's education and future welfare, and the longer the school life the greater is this change in parental interest and outlook likely to be.

We may also expect that the boys and girls themselves, being less disturbed by the prospect of leaving school early, will more readily adjust themselves to their prolonged educational environment, especially when this, as it *must* be, is modified in accordance with the demands of the new situation. Some educationists, realising the need for considerable changes, but not seeing how they are to be effected, are afraid that the raising of the school age will only intensify present difficulties and create insoluble problems for the future teachers of the less intellectually gifted children. This, however, is too pessimistic a view. Certainly, we cannot by Act of Parliament alter in the slightest degree the natural abilities, the home environment, the range of interests or the vocational ambitions of young people. But we *ought*, within the school, to be able to do a great deal when we have convinced the parents and the children where their interests, under the newer conditions, lie. Some suggestions for enlisting parental co-operation have already been made; it is for the schools to secure the wholehearted interest and activity of the pupils. We may reasonably expect that when the preliminary period of unsettlement has been overcome, many of the difficulties caused by it will have disappeared. Nevertheless, the old problems will remain whether we seek to dispose of them in a multilateral or in a selective form of organisation.

The nature of these problems emerges from the present discussion, while in Appendix II is an example which, because it probably differs little from similar organisations elsewhere, may be allowed to serve as a practical illustration. It is not suggested that the problems of classification in such a school are any different from those encountered in the selective schools, but only that the methods of solving them can be more elastic. If, for example, the existing differences in aims and incentives which affect the classifications shown in Appendix II were reduced or eliminated by raising the school age, the ways in which the classes could be regrouped for a redirection of educational effort are obvious The multilateral school might successfully achieve this kind of adjustment; the selective school could not even attempt it.

But perhaps the most important aspect in which the multilateral school can make a positive contribution to the education of tomorrow is that, in it, children meet on common ground. They need not necessarily work together—indeed, in a large organisation, they cannot; but they can, and should, associate in games, physical exercises and in all forms of social and recreational activity. Each child is undoubtedly helped by it to adjust more effectively his personal attitudes to, and relations with, other people, and to avoid forming false ideas about his neighbours. This is not a ' one-way ' influence, for every individual benefits, and the prejudices which flourish wherever there is ignorance disappear with fuller knowledge. No doubt, even in a multilateral school, owing to the immaturity and lack of experience of its members, mistaken ideas will arise, but in different ways and in connection with different aspects of the social order. Longer association together in school of all types of pupil is, however, the best corrective.

Thirteen years of observation in such a school lead inevitably to the general conclusion that hitherto the benefits from these associations have been gained principally by the children in the ' Certificate ' groups, these being, in the main, children from the superior homes in which the ambition to remain at school for an extended period is encouraged. It is unlikely that those parents who dislike the 'omnibus' idea will have realised or appreciated this aspect of their children's education, yet it can be said that the longer such children have remained at school the greater have been the benefits. Those who have completed a Senior Certificate course and have become prefects and house-captains have had excellent opportunities of acting as leaders in a child community which, on the whole, is a fair replica of the adult community to which they will belong. In the sports and games the leaders have had to select house representatives without any regard to the scholastic records and attainments of the groups in which they are taught; in the house parties and entertainments every group has been included in proportion to its numbers. It is, of course, inevitable, under present conditions, that the principal organisers and contributors should come from the best scholastic groups, but it is by no means certain that this will be the case when the school age is raised. Those boys and girls who, by leaving at fourteen, have lost the opportunity of taking a larger share in the school corporate life just at a time when these possibilities were opening out before them, will undoubtedly find much to enjoy in a more prolonged school life, and those who possess leadership qualities will surely find these enhanced and developed by the time they finally leave; the school will provide for that.

In this connection, however, parents and teachers must recognise certain salient facts. Selective schools have always paid special attention to the efficiency of their instruction for the most able pupils and have allowed public opinion to judge the school's general success as an *educational* institution by the number of scholarships, bursaries, certificates and other awards gained by such pupils. In the larger selective schools it has also been possible to form subgroups, some consisting of pupils mainly interested in intellectual pursuits, whose standard of attainment rises far above the average, some, more interested in games or practical activities, content with bare pass standards in their examinations. The result is usually high average achievement by the school in both spheres—in the examinations and on the sports field—but not, as a rule, *by the same individuals*. The multilateral school, in spite of its numbers, usually finds itself, like the smaller selective schools, compelled to call upon the *same* individuals to represent it both in work and in play. This is an excellent thing for the individual, though he often finds that his concentration on examination work is appreciably affected by his activities as a leader in games or in social activities. Should not the success of the multilateral school be judged by the way in which it does its own work and not by comparison with selective schools, with which it is not comparable?

The children who have left school at fourteen, although deprived of the wider benefits referred to above, have, however, acquired a good deal besides a smattering of academic or practical subjects. The effects of bringing all these children into association, albeit not a very close association, with children of other aims and interests have been unmistakable. They include a considerable improvement in the standards of personal cleanliness and dress, a subtle, but noticeable, change in their attitude to formal instruction even in Algebra or History. Their views on the need for, and value of, subjects such as English or Science are not only interesting but very encouraging for the future. Given a real incentive, many of them will be found as keen on progress in school as any other children. Ambitions, too, seem to develop as they begin to understand what lies before others more fortunate than themselves. It is, however, difficult to distinguish this from the effect of changing attitudes in the home and other external influences. Ten or twelve years ago, for example, many girls were prepared to accept domestic service as a suitable occupation. Others wanted to become weavers, etc., in local mills. Now, however, not one in the same class groups (Nos. 9 and 10, Appendix II) thinks of domestic service, and few want to enter the factories. Some desire to transfer to a commercial course, and many hope to find employment as shop-assistants, hairdressers, cash-desk attendants and the like. Boys, too, are only willing to take work as full-time message boys when some prospect of an apprenticeship is attached to it. Before the war made employment so readily available, many preferred to remain at school in the hope of an apprenticeship at fifteen in one of the trades. These effects may have been mainly the symptoms of a change in the general parental outlook, but it is quite possible that the multilateral school has encouraged their formation and development. Be that as it may, the change is interesting, though it may imply a future scarcity of domestic servants and message boys.

As to the minor details of organisation, it may be mentioned that in this particular school boys and girls of the first three years are taught in separate classes, but the reduction in numbers at the fourth year makes it advisable to arrange mixed classes for the more advanced stages. Opinions differ widely as to the merits of such a plan and it would be out of place to discuss them in detail here. Nevertheless, the arrangement of classes has worked without friction for over twelve years and, as the girls' classes are generally taken by women and the boys' classes by men,[1] the related problems of discipline, sympathetic understanding, masculine control (for boys), have all been successfully solved. It can be claimed for this form of organisation that the children themselves prefer to be taught separately during the first two or three years, and if they see each other daily in connection with other aspects of school life, most of them see nothing unusual in being taught together as seniors.

The problem of supervision similarly solves itself when the sexes are taught separately, for the teachers can share more effectively in it, men for the boys and women for the girls. The general welfare of the girls is deputed to a lady superintendent, who is expected and encouraged to take as active a share in the direction of their studies and in their personal and social development as the head of the school takes in the welfare of the boys. By this means the *details* of organisation are not much more complex than they would be in two schools for separate sexes, of 500 to 600 pupils each. This, perhaps, answers the objection regarding size which is sometimes levelled at the larger multilateral schools.

It is true that in certain circumstances separate schools for boys and girls can be equally, if not, in some respects, more effective than mixed ones. The loss of the valuable daily association of the sexes within the school can be offset by gains in other directions. The chief advantages to be claimed for a mixed school are those of economy in administration and equipment, of simplification in staffing problems, especially at the higher stages, and those of association in common activities in which sex is not given any particular emphasis. On the whole, the advantage seems to lie with the more *natural* relationships of the complete multilateral school, especially if the different needs of boys and girls in the matter of instruction are properly cared for.

It is sometimes thought that the multilateral school must be too complex in that its effective administration takes so much of the time and thought of its head that the necessary and valuable personal contacts with the pupils and staff are reduced to negligible proportions. There is a real difficulty here, but it is not an insuperable one, and it will actually be reduced after the problems created by the raising of the school age have been solved. It is true that a great deal of time is required to work out complex dovetailing arrangements for large numbers of children and teachers engaged simultaneously in a great variety of different activities. Time-table arrangements become miniature 'Bradshaws' and may take several months to complete. It follows, therefore, that this aspect of the matter could be simplified by reducing the number of promotion dates in any year. Perhaps when all children have to remain at school until sixteen the need for sending them forward from the primary schools every three months or so will not seem to be so urgent as it is at present. In this connection, however, it may be appropriate to add that when the school roll exceeds 1,000 (or even 800) the numbers can increase very considerably without in any way affecting the *complexity* of the organisation. Such increases create more work of the same kind, more names, more details, more staff arrangements, and so forth; they require more time to arrange, but they do not in themselves make the problems more difficult. On the other hand, the increase in number facilitates refinements in grouping such as were previously impossible.

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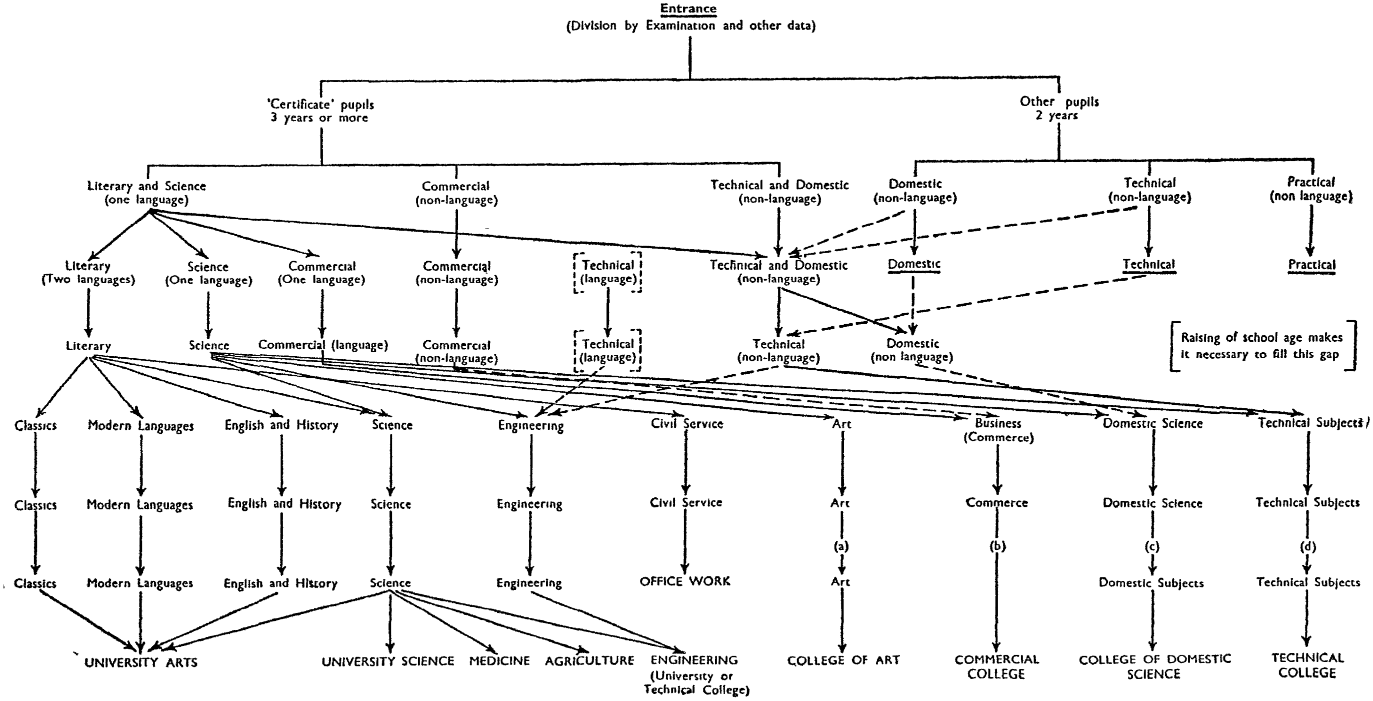
[1] The mixed classes of the fourth, fifth or sixth years may be taken by either men or women.

There is, therefore, not a great deal of substance in some current objections to the large and complex organisation which the multilateral school is thought to be. The larger organisations can be in many respects more efficient than the smaller ones; they are certainly more economical. But the probability is that existing schools, especially those on congested city sites, have no room for expansion, so that, even where they are now applying the multilateral idea quite effectively, they may be unable to do so for the larger secondary-school population about to be created. The school referred to here is a good example. It can accommodate 1,250 pupils. The raising of the school age will increase the number to 1,700 or even more. As the increase cannot be provided for in the existing buildings, the Education Committee must either split these 1,700 vertically (retaining the present principle) or horizontally (abandoning it). They could achieve the former by establishing a separate school for about 850 girls, but it is doubtful whether this particular solution will appeal to them. Nevertheless, better results are likely to accrue from it in the long run than from a return to the selective form of organisation.

But since it is clear that the problems created by the raising of the school age will differ greatly from place to place, and that the solutions found will often be based upon considerations other than purely educational ones, further discussion of this aspect of the question is fruitless. The general merits of the multilateral idea have been sufficiently explained, and its practical working out in a particular case may be conveniently summarised in the diagram on p. 93. It is, however, by no means a final solution of the problem. The arrangement has served its purpose, but with the raising of the school age and with changes in the objectives to be aimed at, considerable revision will soon be necessary. The form this revision might take will be described in Chapter VI.

PARALLEL STREAMS IN THE MULTILATERAL SCHOOL (PRESENT TIME)



N B The raising of the school age will necessitate —
(1) modification of sub groupings of certificate pupils to provide for the 40% now wasted
(2) provision of suitable courses for 'other pupils
(3) further consideration of the problems of transfer from course to course

The broken lines indicate unusual (and often difficult) transfers

Notes

after L C
(a) Architect or Surveyor's Office
(b) Office Work
(c) Domestic Science or Hospital Work
(d) Engineering Works or Allied Occupation

CHAPTER V

CHOICE OF CURRICULUM. SPECIALISATION

TAKING the wider view of secondary education already outlined, it becomes almost axiomatic that the curriculum should be differentiated, as it generally is, according to the abilities as well as according to the interests and aims of the pupils. But the nature and the extent of this differentiation vary considerably from place to place and from school to school. Some educationists believe that the traditional curriculum of the grammar and high schools cannot be much improved and that differences in ability are sufficiently covered by parallel courses progressing at different rates. Others acknowledge that modified curricula are needed for pupils in technical, commercial and senior schools, but only when such schools adopt a completely vocational aim and purpose do their courses of study depart radically from those of the average secondary school. In Scotland, as we have seen, the senior secondary schools are limited by their Certificate objectives, so that even the multilateral ones have not yet succeeded in differentiating their curricula or in adjusting their methods of instruction in any bold or revolutionary fashion. Similarly, the junior secondary schools, restrained as they have been by the leaving age of fourteen, have tended to maintain a conservative outlook in spite of their greater freedom to experiment.

What, then, of the schools of tomorrow? Are we afraid to discard outworn ideas? Is differentiation to be only partial, limited and restricted by traditions which are no longer applicable? Is it to consist mainly of an adjustment of difficulty, or is it to embrace a much greater variety of educational activities than those to which we have been accustomed?

Obviously, we must take a progressive view and our answers must include both alternatives; but always with close reference to precise aims and purposes. High-sounding generalities, such as ‘ preparation for life ’ or ‘ education for citizenship,’ require to be converted into practical procedures, a difficult and—because people always differ about details—often a thankless task.

No fresh statement of the general aims of education need be attempted, but a survey of the wide range of ability in a multilateral school makes it plain that any general aim which is thought to be *universally* desirable must be worked out in very different detail for each individual. It will, for instance, be wasteful to apply to all pupils the much publicised principle of one general, non-specialised course, even though we do accept the view that the chief purpose of an extension of school age is the better *education* of the adolescent and not the preliminary specific training of an apprentice. It may be that both purposes can be effectively served by one and the same procedure,[1] but few people believe in its possibility and fewer still are seeking to discover it. Nevertheless, it is clear that the vocational *incentive* is of prime importance, no matter what form of organisation or method of procedure be adopted.

In this connection it would be a notable sign of progress if those 'educationists' who so frequently express their views in teachers' journals would discard their artificial distinctions between vocational and cultural pursuits. It will be seen from the ability groupings given below [2] that literary and linguistic activities constitute only one, and, to some minds, not the most important, of several aspects of human life and culture. If we are to promote the education of the *whole* individual it would seem that the range of school activities must be considerably extended. Even those who claim 'broad cultural foundations' in existing curricula overlook the narrowness inherent in their special emphasis on intellectual rather than on practical activities, on the literary and linguistic rather than on the constructive and artistic media of expression. From this point of view their reiterated objections to 'early specialisation' seem particularly ill-founded. Indeed, we seem to be on the horns of a dilemma. We desire the cultivation of the whole man, yet for purposes of his education we have to select and even to concentrate upon a small portion of the vast range of possible activities. These conflicting aims can, however, be reconciled by taking a sounder view of the meaning and purpose of *specialisation*.

Specialisation has been variously interpreted, but it will be used here to mean a "concentration of interest and effort on a relatively few aspects of the child's environment, but without completely excluding the remainder." Such specialisation is necessary for everybody. It only becomes *narrow* when other interests are entirely excluded. Current practice in secondary schools illustrates the distinction perfectly. Pupils are said to take a 'general' course to the School Certificate or Matriculation stage; after that, they are said to 'specialise' in a single subject or group of subjects. What really happens is that they begin by specialising in the literary and linguistic activities of the secondary-school course, and continue, later, by specialising more narrowly in a selected branch of them. It is a necessary procedure in most cases, because the subjects selected for the narrower specialisation are those in which examinations are held for scholarships, bursaries, etc., while the subjects selected for the first specialisation provide the foundations for this later work. But why misrepresent the first stage by calling it ‘ broad ’ and why deny the use of the word ‘ cultural ’ to other aspects of human endeavour? And, again, why be so scornful of ‘ vocational ’ studies when the specialised needs of university departments are projected into the school examinations and from them carried down to the curriculum and even to the selection procedures of the first year of the secondary school?

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[1] See pp. 148-154.

[2] pp. 104, 108.

This conception of education as a ‘ humanistic ’ or ‘ liberalising ’ influence originated in the days when man could take all knowledge for his province and when the degree of Master of Arts was a licence to teach *all* subjects. In the Middle Ages a student, before specialising in Medicine or in Law, was required to complete the general Arts curriculum of the university. This practice is often followed by students of Law, even today, because of the close connection between the classical languages, with their associated philosophies, and the development of legal procedure; but it has been more and more abandoned by students of Medicine as the discoveries of modern science rendered their ancient authorities obsolete.

The Revival of Learning also saw the enthronement of the Pansophic Ideal of Knowledge by the early Realists, Bacon, Comenius and Milton, but this is an impossible aim in education for any except those with abundance of ability and leisure. When one considers the inter-connections between modern branches of study, the applications of Mathematics, Mechanics, Physics, Chemistry, Biology, Geography, History and the like to each other and to the amazingly diverse human activities of a twentieth-century community, the task of preparing a child for an adequate understanding of so vast and complex a mass of knowledge is truly formidable. There are relatively few human beings with an intellectual capacity sufficient for so comprehensive a study of the universe, even if they had the time. Most of us find it necessary to apply our physical and mental powers to the task of preparing ourselves, first, to earn a living and, second, to enjoy rationally and sensibly the limited leisure which remains. In both these, of course, further specialised study takes us far beyond the stage reached in school, but few of us are able to direct our intellectual curiosity to the still larger problems of life. The existence of these limitations scarcely warrants an attempt during school years to prepare all pupils for these complex intellectual adventures. Rather does it impose the need for a more careful selection of those who are to be so prepared.

Education, which once was regarded as a liberalising influence for the relatively few, the governing classes of an earlier epoch, is now required to serve as a liberalising influence for the many, the future upholders of democracy. But the principles which formerly guided the educator in his choice of subject-matter, in his aims and in his methods (for if the pupil did not always possess ability, he had plenty of *time*), no longer serve. We have begun to perceive how the variations in the intellectual capacities of human beings affect the problem, and to realise that a study which is liberalising for highly endowed persons only confuses and discourages the less gifted ones, especially in a race against time. Moreover, in regard to time, we have been in too great a hurry; forgetting that the fruits of education are slow to ripen, we have endeavoured to gather them in quantity and in quality at fourteen or sixteen or eighteen. Here, too, we must modify our expectations.

'Last-ditch' battles in defence of 'compulsory Latin' and similar survivals of yesterday are still being waged. But there is no special virtue in the study of a particular subject or branch of a subject, as such. Its value as the material of education lies in the influence it exerts upon the individual who studies it, an influence which may have become negligible for the vast majority of the students of today. The fundamental question in every school is, not whether the study of any subject (be it Latin, Mathematics or Esperanto) is cultural or useful or beneficial to human beings in general, but whether it is so, in deed, for the individuals who, here and now, present themselves for instruction. There is, admittedly, a fairly constant general answer on broad lines, but the view urged here is that the actual answers must vary from school to school and even from year to year. This implies a much more flexible organisation than any we have yet contemplated.

Provision must everywhere be made for each pupil to *choose*, with guidance, a programme of work which will, at one and the same time:

(1) enable him to derive from it many valuable and essential 'liberalising' influences;

(2) give scope for the development of special talents and abilities;

(3) make use of the incentives natural at this stage of development.

We must apply more effectively the definition of specialisation given above. We must allow for the fact that the individual is not equally apt in all forms of activity. When a child's progress is less than that of his class group, improvement is not necessarily secured by endeavouring to remove deficiencies or omissions in his earlier instruction. It is very probable that the previous instruction proved relatively ineffective because the child's lack of aptitude and interest was even then making itself evident. So long as this disability remains, the child's failure to profit from instruction progressively increases, and the disheartening struggle by both teacher and pupil usually ends only when the latter finally leaves school. Instances of the reverse kind, viz., of pupils who eventually overcame a progressive failure, are unfortunately few. Ought we not to recognise this fact and allow our pupils, in the words of the definition, to concentrate more of their "interest and effort on those relatively few aspects of their environment" in which they *can* be successful and to devote less to those aspects in which their aptitudes are negligible?

It may also be useful to mention at this point that the value of any educative influence can never be measured by the time spent on it. A quick student may make greater progress in a short time than a slow student can make in a long time. Our present system of grouping for class instruction is based upon the expectation that our selected pupils will progress at the same rate in all subjects and the time allowed for each subject is often a compromise between the needs of the subject and those of the pupils. Moreover, official regulations are not helpful in this matter. No secondary school in Scotland can obtain approval of a course of study in any subject in which a Certificate examination is to be taken if the time devoted to it falls short of a prescribed minimum, and only exceptionally can a candidate be presented for such examinations who has not had the required number of hours or years of formal instruction in the subject. The consequence of this is, that subjects are arranged in courses in such a way that the alternatives take up corresponding amounts of time. Considerable ingenuity can be expended in providing variety of alternatives, but the extent to which this is possible is much reduced by the restrictions regarding time. If it be argued that these regulations are necessary to prevent or to discourage the presentation of ill-prepared pupils at Certificate examinations, the answer is that this difficulty can be met in various ways—one of whcih is to abolish the examinations! In any case, if we are to secure greater flexibility of organisation and an opportunity for pupils to progress at their own rate, such restrictions must be removed.

We must seek a form of organisation in which the individual can be helped to develop freely and fully *in his own particular way*. We must know, of course, what his special needs are, but, with such knowledge, we ought to construct for each one a project[1] or programme of work which centres in his own characteristic talent or group of talents. Our aim must always be to develop these to their highest possible level, remembering that, to do so, it may be advantageous to save time in some directions and to increase the time and effort in others. We must enable the child to see for himself that to increase power and skill in his favourite activity requires the associated mastery of cognate subjects, so that the recognition of this need by him will provide one of the incentives for the cognate work, which in itself may be difficult and even distasteful to him. At the same time, we shall not expect him invariably to do so well in subsidiary subjects as in main subjects, provided that his attainments are always commensurate with his abilities, aims and purposes.

The last distinction is important. The height of skill and efficiency we expect to be reached must, of course, be relative to the ability and powers of application of the individual, but we may quite reasonably look for a higher achievement than is at present customary, as soon as we have enabled each individual to reduce the wastages of time and energy in his own misdirected and misapplied efforts. This higher achievement in the pupil's main programme of work would of itself more than compensate for lower attainments in the subsidiary ones, but, inasmuch as progress as a whole often requires co-ordinated, if unequal, progress in each contributory part, we may expect to see the one actively promoting the other. A fundamental mistake in much of our present organisation is the cutting up of the field of knowledge into so many disconnected pieces that the pupil only discovers their relatedness and interdependence years afterwards, if at all. For example, many of the procedures we are accustomed to teach in Arithmetic, Algebra, Geometry and Science involve such similar mental processes and are concerned with so much of the same material of experience that they ought to constitute together one integrated body of knowledge at *every* level of the child's development. Yet, how often does the average pupil of fifteen think of them other than as separate, un related items of knowledge? When they do become co-ordinated in his own mind, it is largely through his own mental activity, and only those pupils whose education is prolonged achieve this successfully and completely.

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[1] Project, here, is used in a much wider sense than that implied by the ' project method '—though, as will be seen in the later discussion, the views expressed here are in some respects akin to it.

In short, what we shall hope to secure in the secondary schools of tomorrow is a vigorous *outpouring* of the individual's interest, activity and effort upon those aspects of a wide and comprehensive programme of work which are likely to benefit him most, due regard being paid to his physical and mental powers, his traits of temperament and character, his vocational ambitions and such other influences as may affect the final result.

The programme of work to be made *available* to the pupils would, no doubt, contain all, or most, of the approved educative influences of today, as well as others not yet thought entirely appropriate. Their actual *inclusion* would, however, be determined, not by any claims to recognition they might possess in themselves as media of culture, or as necessary preliminaries to more advanced stages (though such claims must always be considered), but by their suitability in relation to the individual's main impulses towards creative expression. If these were practical in form, then, for example, the Science and Mathematics taught to such a child would have to be practical too; if they were artistic, æsthetic or emotional, corresponding emphasis would be placed upon appropriate activities in Art, Music, Poetry and Drama.

The ' course ' system, as we know it, will, it is certain, be considerably modified in the secondary school of tomorrow. To prescribe a fixed syllabus of work for each month or year as if every pupil could achieve it successfully irrespective of the many variables which condition his progress and efficiency, is obviously unsound. The organisation of classes within courses creates problems of adjustment and transfer which are often insuperable. It is not uncommon to find a pupil whose progress in one subject requires a repetition of the previous year's work, whereas his work in all other subjects justifies a more advanced programme; yet, as a rule, time-table arrangements do not allow this particular fluidity of grouping. If, in preparing time-tables such needs are borne in mind, the variables become too numerous to control. The more common need, however, is for a pupil to work a little behind or a little in front of the average pupil of the group, a difference of weeks or months rather than of years. Such needs can only be met when grouping for instruction is so flexible that any subject can be studied at any stage, whether or not the stages reached in other subjects are equivalent in difficulty or in importance. Since the difficulty and the importance of each subject is relative to the individual and not to other subjects, there can be no hierarchy among the subjects of instruction or the departments of school activity.

Many attempts have been made to individualise instruction, among which perhaps Miss Parkhurst's Dalton Plan of twenty years or so ago deserves special attention. Modifications of the plan have appeared in a number of schools, but although much interest has been expressed in it and a few progressive head masters have devoted much time and thought to its application, secondary schools in general have remained uninfluenced by it. This is partly due to existing conditions of staffing, examinations and general organisation, but it is also due to the idea that the average secondary-school pupil, accustomed to compulsion in various forms, disguised or otherwise, would not be able to direct his own activities successfully in the way expected. A common view is that although the plan might work from sixteen to eighteen, the present class system is to be preferred from twelve to fifteen.

But the time is ripe for a re-examination of the whole position. Consider the change in regard to incentives which we may expect to occur with a general raising of the school age. Once these newer incentives are established, many of the difficulties of the problem will disappear. What we shall require then will be more numerous opportunities for the expression and development of individual interests and abilities, opportunities which the ordinary and customary activities of the classroom cannot provide. The attempts made by some teachers to keep two or three subsections—fast, medium and slow—working at a common syllabus along parallel lines are well intentioned, but they only partially achieve their object because instruction can seldom become individual. The better solution seems to be to individualise the whole procedure.[1] This can be done to best advantage when each pupil has obtained sufficient mastery of the tools and technique of study to be able to learn for himself, suitably guided and directed. Even under present conditions this is shown by many pupils from twelve onwards, and under better conditions could be shown by many more. That the loss of interest and the decline of effort so often seen in the work of class groups at fourteen or fifteen must necessarily occur under all other systems, and especially under one which sets out to create and to maintain interest through self-activity, is an unwarranted assumption and too pessimistic a view for future guidance. It is true, of course, that our present methods too often induce children to depend upon the teachers for orders as well as for instruction. When a group of fourteen-year-old children, accustomed to constant supervision, is left to work alone, it frequently wastes its time, not because the pupils cannot apply themselves individually or independently to prescribed tasks, but because the usual environment of controlled and directed work has temporarily changed. Release from the teacher's overseership becomes an opportunity, first, for a cessation of effort, and then for play, because the immediate spur of the teacher's presence is not sufficiently replaceable by the remoter incentive of the individual's live interest in an activity initiated and sponsored by himself. At sixteen, seventeen or eighteen, also, temporary relaxations of effort will occur whenever competing interests gain the mastery, for at these more advanced stages the habits formed in earlier years are not easily discarded and the attitude of a pupil of seventeen, accustomed to constant supervision, is hardly distinguishable from one of fourteen or fifteen; both react in a similar way when the pressure is removed Yet we do expect more power of application and more self-mastery from the seventeen-year-old, even if our methods and procedures do not help to foster it. But if we could substitute, for the seemingly endless series of piecemeal assignments which we commonly use, a co-ordinated programme of work which the pupil accepts as an important step towards the attainment of his chief desires and ambitions, we might succeed in establishing more fruitful attitudes towards the necessary duties of school, home and occupation.

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[1] Cf. Greenhough, *The Educational Needs of the 14–15 Group*, 1939 (Univ. of London Press, Ltd.).

To do this, however, entails a better use of the individual's abilities and interests by harnessing them to an acceptable programme, instead of imposing uninteresting, and sometimes unattainable, objectives in the mistaken belief that they have some 'disciplinary' value. The individual inventory outlined in Chapter III illustrates the extensive range of human abilities, and the pupil is badly endowed, indeed, who does not possess aptitude in one or other of them. Individuals may display their special gifts in pleasing other people, in managing their affairs, in understanding verbal material, in manipulating numbers, in perceiving space relations, and the like. When these aptitudes are applied in activities such as reading, composing complex statements in speech or in writing, translating, investigating, measuring and calculating, or making, shaping and beautifying useful articles, the individual discovers that, for him, such activities are interesting, absorbing and even exciting, and that as his knowledge or skill increases it can be applied in various useful and profitable ways. Thus, there arises a close connection between the successful development of a special ability and the various achievements of the individual, both in school and in his subsequent occupation. For this reason the early determination of these special abilities is important.

The special abilities most significant to the secondary schoolmaster are set out in the accompanying schema (p. 104). Two of them refer to qualities of temperament and character which the school helps to bring out but cannot implant. Their estimation involves observation rather than measurement. The remainder refer to abilities much used in school work, though the school activities themselves are not readily classifiable under the same heads. All of them, of course, in different combinations, underlie occupational efficiency, and are particularly applicable in the narrower specialisation which precedes or accompanies the choice of an occupation. Thus, success in business or in politics may require, among other qualities, a high endowment of abilities 1 to 4, while success as an engineer can hardly be achieved without abilities 5, 6 and 7.

Since special abilities are compounded of many elements, it is possible to apply them in tasks of differing degrees of complexity and difficulty. Hence a person who cannot acquire the highly developed power and skill needed in some professional activities may achieve satisfactory results at one of the lower levels at which the same kind of ability can be applied. This imposes upon us, so far as school activities are concerned, the duty of investigating the relation between the difficulty of studying a subject or of acquiring a skill, and the abilities of those pupils who attempt to do these things. For while the community always needs individuals whose abilities have been developed to the highest possible degree of efficiency, it can also make good use of others who are not so highly endowed and who have no ambition to scale the imposing heights of an educational or vocational Olympus.

SCHEMA

SCHOOL ACTIVITIES. SECONDARY STAGE

Abilities	*First Year*	*Second and Third Years*	*Fourth Year*
1. Social	Parties Group games Societies	Parties House groups Societies	Houses Societies
2. Executive	Class monitors Leaders in Scouts and Guides	Leaders Organisers Secretaries	Organisers Leaders Captains Secretaries
3. Linguistic	Grammar, Word Studies	Language study Shorthand	Languages
4. Literary	Composition Man on the earth Biblical study	English Literature Bible, History Geography	English History Geography
5. Scientific	Care of the body Study of the earth	General Science	Biological Science Physical Science Engineering Science
6. Mathematical	Measurement of the earth	Algebra Arithmetic Geometry	Mathematics
7. Constructive[1]	Handwork	Technical Drawing Book-keeping Benchwork Cookery and Laundry	Commercial subjects Technical and allied subjects Domestic Arts and Crafts
8. Expressionistic or artistic	Drawing	Art Crafts Needlework	Art Crafts
9. Highly skilled movements (repetitive patterned)	Writing and Spelling Singing Dancing Physical exercises and games	Writing Singing Dancing Physical exercises and games	Music Physical training

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[1] Creativeness is not a separate ability, but is an aspect of the individual's urge to express himself, and may be seen working itself out through any or all of the usual activities of school life

Some general principles governing the more effective planning of a course of studies for each pupil are now clear.

First, the material of instruction appropriate to any stage should not be broken up into dissociated elements, but should be treated as broad coherent systems of knowledge, each with its characteristic unity and with its own intrinsic interest for young people of a given age and stage of development. The construction of such systems is dealt with fully in Chapter VI, but a general indication of their nature can be gained from the tables below (pp. 108-114).

Secondly, the abilities evoked and utilised by the activities listed under heads 1, 2, 9, are clearly those which find most frequent and most fruitful expression in *group* activities, whereas those required for the successful completion of aims classifiable under heads 3, 4, 5, 6, 7, 8, are usually expressed in *individual* activities. Accordingly, we must endeavour to provide adequately for both types, that is, for educative pursuits in which the individual works, sometimes alone or independently, sometimes in company or in co-operation with others.

Thirdly, we should study and provide for every phase of the child's development with all the care and attention each aspect requires. The ideal expressed in 'Mens sana in corpore sano' is as well worth striving for as ever it was, but the ways in which it may be achieved are many. Yet, whatever the route, the *total effort* of the individual should be directed towards the achievement of this aim, and it should at first be distributed more or less evenly over all the activities through which it is to be accomplished. Equivalence of effort does not, of course, always mean equality of time, though it does imply a fair distribution of *interest* over all the main branches of educative activity which are to be included.

In accordance with this principle the distribution of effort during the early stages of secondary education might be:

(*a*) linguistic and literary activities (heads 3, 4), one-fourth;

(*b*) studies in Science and Mathematics (heads 5, 6), one-fourth;

(*c*) constructive, expressionist and artistic activities (heads 7, 8), one-fourth;

(*d*) group activities (heads 1, 2, 9), one-fourth.

and, to begin with, time and effort might be taken as equivalent. Later, however, a redistribution of both will become necessary.

Fourthly, the work of the school should be more clearly defined and should not encroach upon the home, social and out-of-school life of the pupils. 'Home-work,' as it is now, should be abolished, and the preparation necessary for normal progress in school should be arranged and carried out within school hours. If we eliminate the prescribed home study—a desirable change because of the restricted facilities in many homes and the strong competing interests of the radio, cinema, hobbies, societies, clubs, home duties and family life generally—we ought, by way of compensation, to extend the school day. Further, if we endeavour to provide more opportunities for social education through group activities, while at the same time we try to maintain and even to improve present standards of achievement in intellectual education, it would seem inevitable that the secondary-school day should approximate more than it does now to the working day of the adult community.

Lest this suggestion be misunderstood, here, by way of illustration, is one way in which a 44-hour week might be used at the *secondary* stage.

Monday to Friday: 9 a.m. to 5 p.m. or 8.30 a.m. to 4.30 p m.
Saturday: 9 a.m. to 1 p.m.

The day's activities might be distributed thus:

1. 9.0—9.20: group activities, prayers, common service of worship, etc.
2. 9.20—10.50: 1½ hours individual activities (heads *a, b, c*).
3. 10.50—11.0: ten-minute break for milk or its equivalent.
4. 11.0—12.30: 1½ hours individual activities resumed.
5. 12.30—1.10: games or other group activities (change into games clothes).
   1.10—1.25: bath and change.
   1.25—1.55: lunch served in school.
   1.55—2.10: social and group activities.
   (This sequence could be reversed for some if lunches were served in relays.)
6. 2.10—3.40: 1½ hours individual activities.
7. 3.40—4.0: special break for committees, consultations, inquiries, reports or (if not needed for these) group activities.
8. 4.0—5.0: 1 hour self-preparation, individual or group activities as required to complete programme. Games on one or two afternoons.

Thus, the group activities under 1, 5, 7, 8 would absorb about 15 hours per week, of which about 3 hours would be taken for lunches. The individual activities under 2, 4, 6, 8 would occupy 29 or 30 hours, i.e. 10 hours (approximately) for each main branch of instruction when the time is equally divided.

Pupils would spend the whole day, including the lunch hour, in directed but not continuously supervised school activities, and would go home entirely ' free ' for home and social life and for those specialised interests, such as instrumental music, which the school may not be able to include in its day programme (though they might be provided for in an evening programme). The hours of duty of the school staff need not, and preferably should not, coincide exactly with the pupils' hours, but at all other times the teachers should be as ' free ' as the pupils to develop other interests.

It will be observed that the time available weekly for each main branch of activity, viz., 10 hours, is not unduly generous. Taking as a minimum the time allocations made by panels of teachers,[1] it appears that the total time demanded in each week for Languages and cognate studies amounts to 12 hours, for Mathematics and Science (including some Geography) 10 hours, and for Art, Handwork, etc., 10 hours.

These minima were prescribed by the panels independently, but it was obvious when they were announced that they were impossible under the existing conditions of a 28-hour week. These demands could be met by completely eliminating the customary social and group activities of the school or by reducing the number of subjects to be studied or by lengthening the school day. The first alternative is not to be contemplated, but the solution attempted here involves both the others.

Acceptance of a longer day does, however, involve a considerable change in the attitudes of the community to the school and to its functions. Too often, at present, the attitude is not co-operative—as is seen in irregularity of attendance, absenteeism in the weeks before the leaving date, and the like. But it is possible, and indeed probable, that when parents come to regard the school years from fourteen to sixteen as a preliminary apprenticeship to occupational life (see Chapter VII), and when the community succeeds in organising its distributive services (milk, bread, papers, etc.) without exploiting the junior members of its rising generation, many of the present-day practices which interfere with education will disappear. When that happens, an extended school week will be valuable as much for the many indispensable social and group activities as for the desirable, but relatively less important, intellectual and constructive activities. Be that as it may, it is clear that the greater concentration of interest and the increased allowance of time required for any specially favoured group of studies—linguistic, scientific, constructive or artistic—will best be provided (under any system) by appropriately specialising each individual's programme of work at the right moment.

The practical problems arising from the application of this idea must be examined from two complementary points of view: one, the broad programme, to be followed when the child commences his secondary course; the other, the narrower programme, he ought to be following when he completes the former. As these will differ from pupil to pupil, the time and the method of the various transition stages must also be carefully planned.

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[1] Cf. *Curriculum for Pupils of Twelve to Fifteen Years* (Advanced Division): Scottish Council for Research in Education, No. III, 1931 (Univ. of London Press, Ltd.).

Dealing first with differentiation on admission, it is possible, as already noted, to classify by mental ratio into five main groups. But these groups overlap, and the special aptitudes of each individual must be studied and assessed before his curriculum can be considered to be satisfactorily adjusted to his needs. These five groups may be distinguished thus:

Group	*Mental Ratio*	*Special Abilities*	*Nature of Possible Occupation or Profession*
A. Superior	Over 120	(*a*) Linguistic and literary (*b*) Scientific and mathematical (*c*) Constructive and artistic	Professions
B. Above average	106–120	(*a*) Linguistic and literary (*b*) Scientific and mathematical (*c*) Constructive and artistic	Skilled work in factory, workshop, office and shop
C. Average	96–105	(*a*) Literary (*b*) Scientific and mathematical (*c*) Constructive and artistic	Skilled and semi-skilled work (non-repetitive)
D. Below average	81–95	(*b*) Scientific (*c*) Constructive	Skilled and semi-skilled work (repetitive)
E. Inferior	80 and under	(*c*) Constructive	Repetitive work, labouring, etc.

The abilities listed as special represent those aspects of the individual's ' make-up ' which are capable of development to a stage which is vocationally useful. It is not suggested that the same levels of proficiency can be developed by all.

The broad grouping of the first two columns will suffice for the first few months of the pupil's secondary-school life, but during that time steps must be taken to bring greater refinement and accuracy to the diagnosis of the individual's needs. The special aptitudes required in different occupations do not correspond with this particular hierarchy of intellect, and the longer it is retained as a guiding principle the less effective it becomes. All these preliminary modifications and adjustments should be completed by the time the pupil is thirteen, so that from thirteen to fifteen there can be a fairly definite ' orientation ' of his interest towards the kind of occupation he wishes to enter. To achieve such at this stage would require the preparatory or limited specialisation suggested earlier in this chapter. It would take the form of emphasis on selected groups of subjects for which the pupil displayed special aptitude. At fifteen a more pronounced specialisation would begin, based upon the requirements of the selected occupation or profession.[1]

The extent to which the application of this idea would necessitate progressive changes in the content and in the methods of the subjects studied by each pupil would appear to be relatively greater for groups B, C and D than for groups A and B, but some planned development would be needed in them all. This may be seen more readily if the proposals are set out systematically as follows:

FOUR-YEAR PROGRAMME FOR PUPILS FROM TWELVE TO SIXTEEN

First year . .	'Broad' programme, in which all main branches are allowed equal time—but differentiated by abilities.
Second year and third year	Selection of a programme of preliminary specialisation. The pupil chooses one or two *main* groups of studies, a group of *cognate* studies and a group of *subsidiary* studies. The total time allowed for the intellectual and constructive activities is distributed over these groupings of subjects according to need. The emphasis on the main group of subjects—Languages, Science, Mathematics and so forth—is decided by reference to two points: (1) abilities already shown and assessed; (2) the use to which these abilities can be put. The cognate subjects are more or less dependent on the main subjects and select themselves. The subsidiary subjects include subjects not directly connected with the vocational aim, but worthy of inclusion for other reasons.
Fourth year .	Intensive work on group of studies most closely related to vocational needs. Subsidiary work as necessary to complete prescribed programme.

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[1] Suggestions for the working out of this are given in Chapter VII.

TIME ALLOCATIONS

First Year	*Subjects*	*Group*				
		A	*B*	*C*	*D*	*E*
		Hours	*Hours*	*Hours*	*Hours*	*Hours*
a Linguistic and literary studies; 10 hours	English (Composition, Literature, etc.)	4	6	6	6	6
	History and Geography	3	4	4	4	4
	Languages, Foreign (one only at first)	3	—	—	—	—
b Science and Mathematics; 10 hours	General Science and Geography	4	4	4	4	4
	Hygiene and Physiology	1	1	1	1	1
	Calculation and Measurement	5	5	5	5	5
c Constructive, artistic and practical; 10 hours	Handwork	4	4	4	4	4
	Art and Writing	4	4	4	4	4
	Music and Elocution	2	2	2	2	2
d Group activities; 10 hours	Physical exercises	1½	1½	1½	1½	1½
	Games	4	4	4	4	4
	Drama, Elocution, Dancing, etc., Societies	4½	4½	4½	4½	4½

Second and Third Years

Main subjects[1]	12 to 15 hours
Cognate subjects[1]	12 or 11 hours
Subsidiary subjects[1]	6 or 4 hours
Group activities	10 hours

[1] The nature of these subjects is discussed below (pp. 110-115).

Fourth Year

Main subjects	15 hours	Redistributed if necessary according to subjects chosen.
Cognate subjects	11 hours	
Subsidiary subjects	4 hours (minimum)	
Group activities	10 hours	

DETAILED ALLOCATIONS: SECOND AND THIRD YEARS

I. SUPERIOR PUPILS (GROUP A)

The aim of the superior pupils is usually the Entrance Examination to a profession or to the university. For the former, in Scotland, the Senior Leaving Certificate is commonly accepted, the requirements of which include:

English (Language and Literature) and History or Geography;

Arithmetic and Mathematics or Science (two of Physics, Chemistry, Engineering, Botany, Zoology);

A foreign language (from Latin, French, German, Spanish, Italian, Greek, etc.);

A fourth subject selected from a list which includes the above and Art, Music, Commercial Subjects and Technical Subjects.

Since 1939 it has been possible to obtain a Leaving Certificate without studying to the final stages a foreign language or a subject from the Science–Mathematics group, but such a certificate is not accepted for university entrance and in some cases may be unacceptable in some of the professions. Nevertheless, the freedom of choice is sufficient to enable the pupil to specialise in subjects for which he has aptitude and also to select those which have some connection with the occupation he intends to enter. The following are typical examples of Leaving Certificate courses which, under existing regulations, can take a definite vocational bias:

Special Ability.	*Subjects chosen for Examination.*
(1) Linguistic .	English, History (L.), Mathematics and three languages (e.g. Latin, French, German, Greek).
(2) Literary .	English, Mathematics or Science, History (H.), Latin or Geography, French or German.
(3) Scientific .	English, Geography (L.), Mathematics, Physical Science (including Dynamics). Modern Language or Natural Science.
(4) Commercial .	English, History (H.), Geography (H.), Commercial Subjects, Modern Language or Art or Science.
(5) Constructive .	English, Geography (L.), Mathematics or Science, Technical Subjects or Domestic Subjects, Science or Art.
(6) Artistic . .	English, History or Geography (L.), Biology or Mathematics, two of Art or Music or Modern Language.

It should be mentioned that English and Arithmetic are compulsory subjects and that there is only one standard of examination in English, though in most other subjects there are two—Higher and Lower (H. and L. above). In order to qualify for a certificate the candidate must satisfy the examiners in at least two subjects on the Higher standard (including English) and three subjects on the Lower standard (excluding Arithmetic).

There is, therefore, sufficient freedom of choice to satisfy most tastes and ambitions at the mental level represented by a mental ratio of 120 and over, and the compulsory English does not operate harshly against pupils of this intellectual calibre. But it does tax the resources of pupils in the B group whose abilities are mathematical, scientific and constructive rather than linguistic or literary, and whose general intellectual level is represented by a mental ratio of 112 or less. To such pupils the inclusion of literary appreciation in a compulsory English paper is definitely an unfair burden.

Moreover, many A pupils have hitherto been content to leave school at fourteen or fifteen after qualifying for the Junior Certificate (now in abeyance). The aim of this certificate (from 1933) was to provide for similar differences in aptitude and vocational aim at a lower level than that of the Senior Certificate, but by the time its award was suspended in 1940 this intention had not been completely fulfilled. Candidates for this certificate came from pupils in categories A, B and C, but most of the successful ones belonged to the first two, a fact which suggests that the provision of alternative subjects did not, under the regulations in force, increase the opportunity or reduce the handicap of those pupils whose abilities were neither literary nor linguistic. It seems quite clear that Junior Certificate courses with bias towards technical, commercial and domestic subjects, instead of towards linguistic subjects, are open to exactly the same objection regarding compulsory English as are the Leaving Certificate courses. It is inevitable that standards are influenced by the average performance of all the candidates presented, and if, as they are, the A and B pupils are in the majority, the prospect of success of the C pupil is appreciably reduced. Yet if the school age is raised to sixteen we may expect a large increase in the number of candidates from the C group. How are we to provide for them?

If the majority of sixteen-year-old pupils are expected to enter employment with a Leaving Certificate which it is reasonably possible for them to obtain, the existing Certificate Regulations must be considerably modified. Such a certificate should be within the reach of the average and not merely the exceptional individual of the C group; the higher abilities of A and B pupils should be exhibited and certified in other ways. Moreover, the limited abilities of the D and E pupils deserve recognition in some suitable form. Being abilities of a specific rather than of a general type, it is unwise to expect general qualifications or to issue certificates which, because of their low general standard, mean little. But certificates for marked proficiency in specialised groups of subjects seem both practicable and desirable. Just as, in the Scout Movement, a proficiency badge can be earned by any Scout in any branch of practical knowledge, so, in school, there ought to be an opportunity for a pupil's *single* talent to gain the recognition it deserves. A head master's testimonial is not in itself sufficient to set against authenticated and established certificates. Nor is it necessary that certification by subjects should cause the more gifted pupils to develop ill-directed ambitions to collect badges or certificates in large numbers; the *controlled* use of such incentives can be helpful and ought not to be disregarded. The extent to which such methods of certification are needed can be judged from the following suggestions for the detailed allocations of subjects in the B and C groups.

II. ABOVE AVERAGE PUPILS (GROUP B)

PUPILS OF MENTAL RATIO 112 ± WITH SUPERIOR ABILITIES IN ONE OR MORE SUBJECTS

Nature of Special Ability	*Main Subjects, 15 hours*	*Cognate Subjects, 11 hours*	*Subsidiary Subjects, 4 hours*
a (i) Linguistic	Language, English (Language and Literature) History and Civics	Geography, Mathematics or Logic[1]	Art or Music or Natural Science
(ii) Literary	English, History and Civics, Geography	Language, Mathematics or Logic	Art or Music or Natural Science
(iii) Secretarial	English, History and Civics, Geography	Language, Mathematics or Logic	Art or Music or Natural Science
b (i) Scientific	Natural Science, Physical Science, Mathematics	Geography and History, English	Language or Art or Music
(ii) Scientific and Mathematical	Physical Science, Mathematics, Applied Mathematics	Geography and History, English	Language or Art or Music
(iii) Mathematical	Mathematics, Applied Mathematics, Physical Science	Geography and History, English	Language or Art or Music
c (i) Constructive (boys)	Technical Subjects, Mathematics, Physical Science, Crafts	Art, English	History and Geography or Language
Constructive (girls)	Domestic Subjects, Natural Science,	Art, English	History and Geography
(ii) Artistic	Art or Music, Crafts, English	Geography and History, Logic	History and Geography or Language

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[1] Logic: a treatment of English, Arithmetic, Practical Measurement and General Science designed to lead the pupil to a perception of the main characteristics of the reasoning process; the aim is not mastery of specific facts in Mathematics, Science or English. The validity of an argument is more important than the style in which it is written, but it is obviously related to the words in which it is expressed. Needless to say, no programme exists in this form yet. Similarly, in interpreting the subject headings, the content should not be limited to present practice.

The time allocations are not fixed but are adjustable for each individual according to his need.

III. Average Pupils (Group C)

Pupils of Mental Ratio 100 ± with Abilities above Average in One or More Subjects

Nature of Special Ability	*Main Subjects, 15 hours*	*Cognate Subjects, 11 hours*	*Subsidiary Subjects, 4 hours*
a (i) Linguistic	—	—	—
(ii) Literary	English, History and Civics, Geography	Natural Science, Logic	Language (exceptionally) Art or Music
(iii) Secretarial	English, History and Civics, Geography	Natural Science, Logic	Art or Music
b (i) Scientific	Natural Science and Physical Science, Mathematics	Mathematics, English	Art or Music
(ii) Science and Mathematics	Physical Science, Mathematics, Applied Mathematics	Geography or History, English	Art or Music
(iii) Mathematical	Mathematics, Applied Mathematics, Physical Science	Geography or History, English	Art or Music
c (i) Constructive (boys)	Technical Subjects, Mathematics, Physical Science	Art English	History or Geography
Constructive (girls)	Domestic Subjects, Natural Science, Crafts	Art English	History or Geography
(ii) Artistic	Art or Music, Crafts, English	Geography or History, Logic	History or Geography

Assuming a leaving age of sixteen and a standard of attainment in the *main* subjects equivalent to that of the Higher Grade pass in the Leaving Certificate as it is today, it is evident from the above tables that, under existing regulations only those fortunate pupils whose special abilities are linguistic and literary (i e. subgroups *a* (i), *a* (ii), *a* (iii)) are likely to be successful. In order that pupils whose abilities are mathematical, scientific or practical should have an *equal* opportunity of gaining a certificate, provision will undoubtedly have to be made for a lower requirement in English. Indeed, all subjects will require to be organised systematically so as to provide for at least three different standards, viz., the main subject, the cognate subject and the subsidiary subject. This may seem to involve unnecessary subdivision and duplication, but, unless the accumulating evidence regarding the differentiation of abilities is to be completely ignored and present-day injustices perpetuated, there is no other way of giving equal opportunity to the diverse combinations of ability and interest which are found in human beings. And, incidentally, it will never be satisfactory to regard cognate and subsidiary subjects as truncated and abbreviated portions of main subjects; each will require its own distinctive approach and treatment according to its aim and purpose, even though it may also be desirable to ensure that the individual whose progress warrants it can progress from a subsidiary subject to a cognate subject and from a cognate subject to a main subject.

It is unnecessary here to discuss in detail appropriate subdivisions for the D and E pupils. It will be obvious that their special abilities will not, as a rule, be so highly developed as those of B or C pupils, but occasionally they may be. Ability in the literary and linguistic activities is usually very slight, so that studies in the English group of subjects are necessarily of a subsidiary order. Greater strength is often, but not invariably, shown in constructive activities, which accordingly dominate the curriculum. But the customary pursuits in the secondary school which fall under heads *c* (i) and *c* (ii) have little obvious connection with occupational life and therefore possess a limited appeal to the pupils of less than average ability. Even for the average pupils the activities associated with the subjects listed under *b* (i), *b* (ii) and *b* (iii) are prone to become too formal and abstract, so that in dealing with the abilities of pupils in categories C, D and E we seem to require a fresh approach in *all* subjects. Since the main incentive, here, will always be a vocational one, these problems cannot be satisfactorily settled without reference to the 'end problem,' i.e., to what the individual is to become when he leaves school at sixteen. No solution based solely on the activities of the day secondary school as they are can be considered adequate. The problems of continued education must also be taken into account.

It is true, of course, that a different aim might be adopted, that the secondary schools might try to cut themselves off entirely from vocational considerations (leaving specific training to the apprenticeship and continuation stage), and devote their time to social education, to physical training, to bodily care, and to general education through the medium of Literature, History, Civics, Geography, Science and the like. But what motives, what interests and what incentives are to be substituted for vocational ones in the case of the C, D and E pupils? The A pupil, preparing for a profession, has a very definite vocational objective. The other pupils must have theirs too. Unless they do, not only will their work be indifferently done, but the transition from school to employment will probably be made as haphazardly and as unsuitably as it is at present. We shall not be able to improve the vocational guidance of our young people at sixteen if we decide to ignore their aims and ambitions until they are sixteen.

It is not impossible to state, in terms helpful to the solution of school problems, what are the basic needs of (*a*) the highly skilled, (*b*) the moderately skilled and (*c*) the semi-skilled worker, in most of the common occupations. The organised trades, such as printing, have already decided what abilities and knowledge they expect their apprentices to possess. If this procedure were suitably extended we could, by comparative study, state what elements are common to groups of occupations at any given level, and what are peculiar to each. Then we should be in a position to lead from the curricula of the thirteen to fifteen stage, to the 'specialisation' of the fifteen to sixteen stage, and thence to apprenticeship and continuation or evening school. But this problem requires a chapter to itself[1] Before discussing occupational bias, however, it will perhaps clarify the above suggestions regarding subject grouping to explain how co-ordinated subject groups may be developed. Accordingly this topic forms the subject of the next chapter.

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[1] See Chapter VII

CHAPTER VI

CONSTRUCTION OF WORK PROGRAMMES

It was said (page 104) that the material of instruction appropriate to any stage should not be so broken up that its elements become dissociated, but should be treated as one unified system of knowledge, the apprehension of which would be far more valuable to the developing individual than an exact mastery of numerous unrelated elements would be, even if attainable. The nature of these co-ordinated systems will vary from stage to stage, and perhaps from individual to individual, but this guiding principle should, at all stages and for all individuals, govern both the selection of our material of instruction and its arrangement and presentation. The aim should be to help the pupil towards that integration of the elements of his *own* experience without which full understanding is delayed. Slowness in comprehension may result from the difficulty of the mental processes involved; it may indicate the need of repeated presentation whenever perception is imperfect or incomplete; it may even be a symptom of the pupil's inability to analyse his experiences and to discover the bonds which connect them; but in all cases it is the teacher's task to discover and to remedy these individual deficiencies.

It must be admitted that much of our specialised teaching at the secondary stage too readily assumes that the pupil already possesses the ability required for these dissections and recombinations of experience. Some teachers do, of course, within the range of work allotted to them, consider the relation of their own subject to the facts and the mental processes of other subjects. Staff conferences, too, sometimes endeavour to secure co-ordination of effort among different departments; but when full allowance has been made for these strivings after more effective teaching, it must be said that they are often applied too irregularly and without sufficiently clear guiding principles. Yet the possibilities of fully co-ordinated effort are very considerable.

Mathematics and Science are two groups of subjects which have much in common, both in regard to the facts presented and to the mental processes used. All branches have to be effectively co-ordinated in the mind of the pupil if he is to make progress in the subject as a whole. Yet we often see Arithmetic, Algebra, Geometry and Science taught in self-contained compartments (even though the same teacher is responsible for them all), with unsatisfactory results. Of course, the co-ordination of subjects is not a new idea. It has been advocated and applied with more or less success to the teaching of History and Literature, History and Geography, English and Modern Language, Art and various forms of Handwork, and to other subject combinations. Nevertheless, as an aspect of Method, its fruits seem to have been meagre, sometimes, no doubt, because the teacher who specialises in one subject appears to lose interest in, or contact with, other subjects, and sometimes quite definitely because the rigidity of syllabuses, pressure of examinations and similar restricting influences limit the opportunities for expansion, even when the need is felt and the desire is present. Many head masters are so convinced of this general defect in the secondary curricula of our day that they desire to see teachers trained to teach cognate subjects not, as hitherto, in isolation, but as part of that comprehensive and integrated body of knowledge which the pupil's progressive mastery over his studies should produce. This is not simply a matter of differently trained teachers; the work programmes of the school require considerable overhaul and re-orientation. In this connection, however, it may be as well to say that there are few fresh realms of experience or knowledge suitable for inclusion in the secondary-school curriculum. Most of the facts and processes suitable for this stage are already taught in schools of one type or another. What is wanted is a better way of arranging them.

When we analyse the material of instruction we find that it involves a relatively small number of basic mental processes but a very large number of 'facts' or 'items,' and that these are classifiable into characteristic groups such as those described on pages 41-2. Many psychologists will agree with Spearman's account of the processes of cognition in which he states that the basic principles consist of the perception of relations and the eduction of correlates. If the 'relatedness' of the elements of experience is the foundation of progressive thinking, then good teaching consists in the presentation of the material of instruction in such a form that the pupil is enabled more readily to perceive essential relations and to build new ideas from them. The facts and the operations which make up the subject must be selected and arranged in such a way that these foundations of mental development are firmly laid, for only when they are can there be any effective understanding. This is the very antithesis of rote learning, which, by inducing familiarity through repetition, may have its use in facilitating recall, but which can never be a substitute for clear cognition. Nor can the accurate reproduction of material learnt mechanically by rote be regarded in any circumstances as a sign of comprehension. Comprehension may follow after mechanical repetition, but it is not necessarily induced by it and, indeed, need not occur at all. On the other hand, comprehension facilitates learning and reduces the number of repetitions required for complete recall.

All these are well-established facts of learning; nevertheless it is from this point of view that the organisation of the subject-matter of instruction must be examined. An approach to a topic which satisfies an adult conception of logical order is usually unsuitable to children because it introduces abstractions and creates difficulties before the pupil's experience is organised to deal with them. An illustration will be found in Euclid's order of proof for the elementary propositions of Plane Geometry. The 'pons asinorum' (I, 5) with which generations of schoolboys were tormented was only one of the many problems which minds, inexperienced in the analysis of spatial material and in the rigorous requirements of formal argument, could not readily grasp. It may be easier to understand the argument of another than to develop the same sequence of ideas for oneself, but even this requires the necessary experience in perceiving relations and educing correlates; and there were, in Euclid's sequences, many artificial barriers to the direct perception of geometrical truth by young people of twelve or thirteen, whose perceptual experience was scanty and unorganised. The recognition of this fact led, of course, to the various recommendations for improvement in the teaching of Geometry which have appeared during the twentieth century. In other subjects, too, a psychological rather than the logical approach has produced important developments in the selection of material and in the order of presentation. Yet there still remains room for considerable extension of the principle.

A scheme of work may be reduced to a mere list or schedule of items, such as topics to be discussed, facts to be learnt, experiments to be performed, articles to be made, and so forth; in such a case, the conversion of the scheme into a living and effective classroom procedure rests with the teacher, and much depends upon his skill and enthusiasm. Again, the scheme may describe in some detail the order in which the items should be taken, and by indicating the ground to be covered in each term or year may also set the rate at which the pupils are expected to assimilate it. This may leave something to the discretion of the teacher, but if rigidly applied cannot leave much. Or, again, it may explain the procedures to be adopted in presenting the items, the modifications necessary in varying circumstances, the results to be expected with different groups of pupils. If such a scheme be given as a guide rather than as an instruction, as advice rather than as a prescription, it may prove more valuable than either of the others, but it will require a more enlightened planning and more constructive thinking than is usually given to schemes of work.

It is in this direction that future progress certainly lies, for there is little doubt that an unimaginative conformity to textbook sequences and procedures contributes to much ineffective teaching. An examination syllabus can seldom in itself constitute a satisfactory scheme of work, and textbooks specially designed to ‘ cover ’ examination syllabuses tend to direct their attention more towards the end of the learning process than to its beginnings.

A textbook should be a supplement to a scheme of work and not simply a substitute for it. A good textbook can encourage a natural progression and so aid effective learning; a bad textbook delays progress because, *inter alia,* it stresses unessentials, blurs or omits the essentials, introduces difficulties unexpectedly or in the wrong order, and so hinders quick and accurate comprehension. It may be that the effective application of the general principles of co-ordination and integration of subject-matter will require not only better schemes of work but suitable texts and exercises constructed on the same principles. Even so, the textbooks and other materials must always be subordinate to the teacher's carefully worked-out plans, since these must, of necessity, be adapted to the pupils of the week, month or year with whom he has to deal.

In this connection, bound texts may prove uneconomical; the material of instruction may be more effectively provided in forms which will facilitate additions or omissions, changes in sequence or in emphasis, according to need. Separately printed pages of notes, exercises, tests, etc., which, gradually collected together as the pupil works through them, would build up his own textbook and completed scheme of work, seem to present possibilities of fluidity and of adjustment to individual needs which current methods and procedures do not. Perhaps in this direction, too, lies the solution of the problem of individual courses (referred to on page 101). If texts, notes, exercises, tests, etc., can be written and arranged so that the energy at present expended by teachers in over-elaborate oral explanation, blackboard work, dictation of notes, and the like, could be set free for use in other ways—such as supervision of individual work, directional hints to the quicker pupils and supplementary instruction to the slower ones—another constructive step towards better secondary education will have been taken. Group instruction is as desirable as it is necessary, but the methods of the lecture are seldom appropriate in school procedures and the dictation of notes is a sheer waste of valuable time.

It follows, then, that the development of co-ordinated programmes of work and of better classroom procedures together constitute one single problem whose effective solution requires for each *main* branch of instruction or each group of studies a detailed statement of:

(1) All the facts or items of knowledge which the pupil is expected to have acquired before commencing the new programme.

(2) The standard procedures which the pupil should have previously mastered.

(3) The range of facts, activities and operations to be embraced within the larger instructional units of the new programme.

(4) The extent to which they fall into groups of many or of few 'linkages' with other facts, activities and operations.

(5) The level of difficulty and complexity at which the new facts have to be cognised and the new activities and tasks performed. Difficulty may result from a direct increase in the *number* of items to be apprehended or it may be the effect of complicated inter-relations among different items. Thus, the relation that 2 is *half* of 4 may become more difficult to perceive when it is expressed in verbal, spatial or other forms, such as are common in the material of Algebra, Geometry and Science.

(6) The number and kind of facts and tasks to be dealt with at each level of difficulty.

(7) The most appropriate order or sequence in dealing with the tasks selected at each level of difficulty. In many cases it will probably be desirable to bring together, at each level, all tasks of equivalent difficulty and to secure the effective mastery of these before advance is made to a higher level. Alternatively, it may sometimes be useful to pass from one level to the next higher one while simultaneously extending the range of activities at the lower level. The procedure required will depend upon the nature of the subject-matter, upon the total number of stages or steps of difficulty to be mastered and upon the importance of each in relation to the rest.

To describe such a programme of work in detail for a selected combination of subjects would require a book in itself; but as this outline of procedure may seem obscure without some illustrative example, it may be helpful to describe some of the first steps towards the construction of a co-ordinated scheme of work in the 'Foundations of Science,' by which is meant the Arithmetic, Algebra, Geometry and Science appropriate to pupils at the secondary stage.

No knowledge of Algebra, Geometry or Science is assumed, since most primary schools limit their mathematical work to Arithmetic. In this branch of the subject the operations in which adequate skill is necessary may be summarised as follows:

Addition, subtraction, multiplication and division of numbers not too large for mental operations (with such aids to memory as writing them in symbols may give). These basic operations are applied to the numbering of whole objects, distances, money, time, weights and quantities (solid and liquid), and to parts of objects, distances, money, time, etc., represented by fractions (and sometimes by percentages and decimals). The necessary tables of measures for conversion of units comprise length, weight, capacity, time and money.

At the primary stage difficulty has often been regarded as proportionate to the size of the numbers and quantities to be operated with, but recent investigations have thrown an interesting light on many of the problems of this stage.[1] Incidentally, they confirm one of the guiding principles stated above, for they show that the intrinsic difficulty of an arithmetical operation depends upon the nature of the relations involved, certain of the common number combinations and number operations being more difficult to learn than others. What is true of the first stages of number is equally true at later stages, such as the commencement of Algebra.

Apart, however, from the difficulty of an arithmetical operation which results from the size, or the number, of the quantities and processes to be dealt with, or from the nature of the mental processes involved (in so far as they use, or do not use, visual, auditory, or tactual experiences), there is commonly introduced into all 'number work' the complication of verbal expression. What are called 'problems' are usually the verbal statements—simple or complex—of familiar operations or transactions with numbers and quantities. Difficulty is increased or reduced by the wording of the problem, whether the operation in itself be easy or difficult. For this reason ability in solving arithmetical problems verbally stated has played a prominent part in the selection of pupils for admission to secondary schools. The ability involved in such problem solving, being partly verbal and partly mathematical, gives a closer approximation to an 'all-round' ability than facility in number operations alone (i.e. speed and accuracy in adding, etc.) can do.

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[1] *Studies in Arithmetic*, Vols I and II : Scottish Council for Research in Education, Nos. XIII and XVIII, 1939, 1941 (Univ. of London Press, Ltd.).

But the information provided by a child's success in giving a correct answer to a problem is only partial. Thus: What is four times a quarter of four and a quarter? Since four quarters are equal to a whole, the result is the whole, viz. $4\frac{1}{4}$; but many children write this:

$$\tfrac{1}{4} \text{ of } 4\tfrac{1}{4} = \tfrac{1}{4} \times \frac{17}{4} = \frac{17}{16} \qquad \tfrac{4}{1} \times \frac{17}{16} = 4\tfrac{1}{4}$$

Unless the complete mental operation is written down we have no clue to the method used; yet while the first represents a prompt recognition of the part-whole relation, the second merely indicates a practised skill in the process of multiplying simple fractions and a literal, but perhaps unimaginative, translation from verbal to numerical symbols. Are such differences in the effectiveness of the responses of individual pupils due to defects in their instruction or to the inability of some of them to apprehend the relations involved? Certainly, pupils who make slow progress do display some fundamental inability to perceive the essential relations, but it is also true that an inappropriate method can create many of the difficulties with which such pupils are perplexed.

It is clear, then, that a pass-mark in an attainment test in Arithmetic may mean several things. It may mean that the pupil can perceive quickly the essential number relations of a problem, or that he has been so well directed that he can work successfully according to rule, or merely that his acquaintance with number operations is just sufficient to gain him the pass-mark. These three levels of performance represent three different mental backgrounds in the approach to Algebra, a fact of considerable importance when it is remembered that it is a big advance from the level of difficulty so far reached in number operations to that involved in the abstract processes of Algebra.

The pupil commencing Algebra is not unfamiliar with the use of signs and symbols. The operational signs of Algebra are the same as in Arithmetic (+ - – × and =) and it is not difficult to convey first ideas of £*a*, *b* pencils or *c* rabbits. But when the manipulation of such quantities (with or without numerical substitution) involves statements such as:

$$a+b+c=20 \qquad m+n=p \qquad y-x=5$$

they require the perception of the 'wholeness' of any quantity, known or unknown, and of the ways by which the 'whole' is divisible into 'parts.'

When $(a+b+c)=20$, the wholeness of $(a+b+c)$ is a known quantity, arithmetically considered; when $(m+n)=p$, the wholeness of $(m+n)$ is an unknown quantity arithmetically, but a known quantity algebraically. This distinction is not easy to perceive; indeed, the perception of this and similar basic relations in any complex number situation is often the more difficult part of the task. In the arithmetical problem quoted above ($4\frac{1}{4}$), the fundamental relation of part to whole, viz., that the whole is the sum of its parts (or, in situations introducing factors, that it is the product of its parts), and that, consequently, one part is the whole minus the other part (or with factors, that it is the whole divided by the other part), is seldom perceived immediately by children of 11 +, because such children are not yet experienced in handling their number problems in this particular way. Yet it is towards the establishment of these basic laws by induction from particular instances that work in Arithmetic, and later in Algebra, should be directed. Many of the illustrative examples of symbolic expression found in Algebra textbooks are statements of these laws in various forms. Thus:

"By how much does x exceed 3?" "By how much is y less than 10?" "What value has x when $6+x=17$?" "When $x-4=10$," "when $5\times x=30$." "Three years ago a boy's age was x years. How old will he be in 12 years?"

Considerable variety in the order and form of expression is usually introduced, so that the pupil may become familiar with the forms in which the algebraic or symbolic representation of quantities will be needed. Yet this variety may, and does, become confusing to the pupil whenever the basic relations are not clearly understood. The pupils who possess mathematical ability (which, as already suggested, is largely the ability to perceive this kind of relation) may eventually discover them for themselves; but the others need help which the textbooks do not offer, and which teachers also may fail to give when they do not realise that the need exists.

Again, some of the terms used in Algebra (*sum, difference, product, quotient, factor*) are already familiar, but their meaning requires extension. This may come through the use of analogy, i.e. discovering that the same relation exists between separate pairs of variables:

> just as $3+2$ is a sum, so $a+b$ is a sum;
> just as $3-2$ is a difference, so $a-b$ is a difference.
> (The further idea that $3-2$ may be a *sum* comes later.)

Two new terms—*coefficient* and *index* or *power*—are also encountered; but though the pupil may bring some arithmetical experience of factors to the understanding of the former, he has to accept the latter as yet another rule of notation. Exercises such as "Write down expressions for the square of x, the cube of y, thrice d, six m, the fourth power of p," with various substitutions of numerical values, are intended to fix the meanings of these terms by frequent practice.

But, in dealing with these meanings, two points must be remembered:

(1) that the term may be used merely as a *label* to distinguish one quantity from another;

(2) that familiarity with the formal expression (in words) of the logical definition of a term does not necessarily represent comprehension of its meaning.

Frequently, these two usages go together; a formal definition is given to be learnt by heart, while the use of it in numerous examples is considered sufficient to establish it as a practical procedure. But the grasp of a logical definition is much more difficult than the use of a label, and definition (in the strict sense) ought to be postponed until the child's own experience enables him to give sufficient definiteness to his statements. Improving the phrasing of the child's definition is a comparatively unimportant refinement when the basic experiences and mental processes involved in producing the definition are appropriate and correct. Asking for a formally correct definition when these mental processes are not taking place is a complete waste of time.

Similar points of difficulty occur in connection with signs. Plus (+) and minus (−) signs are already understood as representing operations of opposed meaning, but it is not easy for the pupil to think of these signs as attached to quantities to represent *directions*. When they are thus employed in Algebra without any reference to corresponding usages in other kinds of problems, it takes much longer to get the directional meaning of a sign properly understood. Here, as elsewhere, argument by analogy is often invoked and various illustrations are available, e.g.:

Thermometer readings above and below zero.
Heights above and below sea-level.
Measurements along a straight line in opposed directions.
Opposed points on the compass.
Debit and Credit or Profit and Loss in money transactions.
Handicaps in sports and games added to or deducted from a scratch ' figure.

But the effective use of such illustrations presupposes that the child has had experience of them. If he *has* had this experience, the argument and the explanation may be promptly understood; if he has *not*, it is unlikely that they will be. Hence it is very desirable that the introduction of these topics in Algebra should come at a moment when suitable work in cognate subjects has been completed.

Now, a little analysis along these lines shows that the practical problems of elementary Geometry and Science (including some Physical Geography) express in different forms such general laws as:

(1) Subtraction is the complement of addition (in Geometry, lengths and angles; in Science, lengths, weights, etc.).

(2) Successive subtraction of parts is the subtraction of a whole equal to the sum of the parts (a truth easily perceived when using a balance).

(3) Signs attached to quantities may be directional, and because the reversal of a negative direction is a positive direction, a quantity such as $-(-2)$ becomes $+2$.

(4) A series of movements in the same or in opposite directions can be expressed as a total movement from the starting-point when the movements are in the *same straight line*; similarly a series of corresponding operations with different quantities can only be reduced to a shorter statement when the quantities are of *the same kind*, e.g. $7a-3a+4a-6a$.

These are but a few of the ways in which the fundamental laws should be sought for and applied, but enough detail has been given to illustrate how a co-ordinated programme of work may be constructed.

Just as the basic laws of Arithmetic and Algebra are also encountered in Geometry, so the axioms of Geometry can be illustrated in many of the operations of Science and in numerous facts of everyday life. The equation, for example, is not an arrangement of symbols peculiar to Algebra; it is the statement of a truth—the identity, in one aspect or another, of two apparently dissimilar quantities. The establishment of such a truth is a common operation in elementary Science, and the use of the balance necessitates a statement of equality or identity in terms of Mathematics. Any pupil who through such practical activities discovers for himself the meaning and use of a simple equation will rarely have difficulty in solving one.

Perhaps the reader who is not very familiar with the processes of Mathematics and Science will be helped to understand the nature of these basic analyses by means of a brief summary of the mental processes required in the tests of ability for English and Science previously described. That concerned with ability for English, for example, begins with a vocabulary test, in which the pupil is required to pick out, from among several alternatives, a synonym for each given word. The other words are such that the selection of the right word implies a recognition of those attributes or qualities of the object or action expressed by each word which are essential in a correct definition. It is not necessary that the pupil should be able to give a logically exact definition such as would be required at a more advanced stage, but his choice of the right word should, and usually does, indicate that the experience out of which definition eventually emerges is developing towards it. (Guesswork is largely eliminated and a pupil's success in such a test is not appreciably influenced by ' lucky shots.')

The next part of the test introduces word pairing; the testee has to select certain adjectives and nouns which are most appropriately used together. Now, in this, as in the other parts of the test, pairs of words could be included which vary greatly in the character and quality of the perceptual processes underlying them. For instance, the facts of Science or Mathematics require words to be used with precise accuracy, as also do those statements in History, in Geography or in any other subject which claim to be objective. But language also deals with ideas, feelings, states of mind, etc., and words used to express the feelings or the responses of an individual to a particular situation are less confined by the laws of logic. Poetry and imaginative prose are in general the products of minds whose use of words is pictorial, emotional and descriptive rather than analytical or logical, and the appreciation of literature by the pupil requires a similar approach. Hence, a test of ability to use words in literary forms should show whether the pupil's developing experience in word usage is of the required kind. If he shows a sense of the finer shades of meaning conveyed by one set of words rather than by another, he is displaying an ability which is fundamental in all study of language, including the mother tongue. In this particular test less attention was paid to the literary than to the linguistic elements in word usage, but it has become clear from the results what steps should be taken to increase the correlation with literary, as distinct from linguistic, ability.

Similarly in the processes of sentence completion, much depends upon the meanings of the words used. Compare these two items:

(1) The air was growing (thicker, darker, cooler) with the queer acrid (feel, smell, taste) in it that high hills bring.

(2) Roads become slippery when (rain, snow, fog) is (melted, dissolved, frozen) by the heat of the (sun, moon, stars).

Both are in the same form, but the former comes from the test of ability for English, whereas the latter is from the test of ability for Science. No scientific exactness controls the choice of words in the first example as it does in the second.

The connection between the ability in word usage shown by this test and success in a School Certificate examination has been clearly shown (page 61). It proves that progress in the study of a subject depends upon the ability to deal successfully with the fundamental processes and operations involved in that subject. In so far as this kind of analysis is a necessary antecedent to the discovery of aptitude, it surely follows that there is a place for it in the better adaptation of schemes of work to individual needs. And, further, it is not unlikely that the effect of such adaptation will help to remove many of those doubtful cases whose final performance is not commensurate with their initial promise.

Examining the test of ability for Science from the same point of view, we can see why the test has been rather less successful than the test of ability for English. It is in six sections. The first deals with relations of size (larger or smaller) as applied to the single measures of length, weight, money, time and capacity taught at the primary stage. These comparatively simple relations are made more complicated by stating the quantities in different units.

The first section also includes examples of the part-whole relationship existing between the components of common objects familiar to a child of eleven to twelve, complicated by the necessity for perceiving clearly the *function* of the part in relation to the function of the whole. The instances are made progressively difficult by introducing alternatives which require deeper analyses and by passing from concrete qualities and attributes to abstract ones. Thus, the examples progress from:

Every house has a (step, roof, curtains, linoleum, door). Select two,

to:

Every church has a (pew, people, preacher, pulpit, prayer-book).

The next two sections require the classification of objects through the recognition of the similarity of their attributes. The material includes familiar facts about common objects, animals and colours, verbs of action, nouns of emotion, etc.; but the classification is made more difficult in the harder examples by including words or objects which resemble each other in aspects which are not common to them all. Thus, the examples proceed from:

treacle, gold, coal, copper, aluminium, paraffin (select three)

to:

meat, bread, fish, potatoes, poultry, milk

and from:

horse, pigeon, beetle (saddle, eat, goat, chirp). Choose one,

to:

shop, market, store (stable, stall, bank, station).

In the next section the process of analogy is employed. The relations to be perceived are double ones, the attribute or quality or function connecting the first-named pair being matched in the second pair. Thus: as fur is to bear, so feathers are to (man, down, camel, chicken).

Among the attributes employed are those of use (e.g. knife, gun, ear, eye, coat, food), size, weight, temperature, number, etc.

The harder examples introduce relations of cause and effect (e.g. poison—death), abstract relations instead of common objects, and the complications which arise when the relations are reversed.

The choice of examples in Sentence Completions (the next section of the test) has already been explained. In these items, apart from a clear perception of the attributes of the objects or actions to which the words refer, the testee has to hold in his mind a varied assortment of facts until the complex set of relations between them has been discovered. In the harder examples, failure usually occurs through inability to do this, the words selected in the second half of the sentence bearing no relation to those selected in the first half.

In the final section use is made of the simpler processes of reasoning based upon definition and classification. Ability to distinguish definite and indefinite quantities (e.g. Is a pint of milk always larger than half a pint? Is a whole orange always larger than half an orange?), to recognise the general propositions of equality and inequality (e.g. if $a = b$ and $b = c$, then $a = c$), and to deduce simple conclusions from given premises (John is a bus conductor. All bus conductors are good-natured. Is John good-natured?) are all included. A final exercise in formal definition is more difficult than any preceding examples in which similar processes are employed, because it necessitates both a preliminary classification and a subsequent precise statement of the limitations imposed by the classification.

This brief account of mental processes which are constantly used in presenting the data of elementary Science should suffice to show the relation of the test to ability in Science. At the same time, it may support the view that the presentation of Science data in the laboratory could be improved by a similar analytic approach.

The general lines along which the analysis of the subject-matter of instruction and its recombination in more suitable forms might proceed are now sufficiently clear. The details will vary greatly from subject to subject, and since no single individual can be expected to be experienced enough in all subjects to complete the task himself, it seems desirable that small groups of experienced persons should get together for the combined work. Nevertheless, it is not work that committees or representative panels can undertake. These may offer suggestions, criticism, advice, but the exact and detailed analysis and the constant experimenting, adjusting, adapting, arranging and rearranging necessary before any practical and effective scheme can be produced must always be the work of one or two well-trained individuals with appropriate experience of classroom problems.

It is in this connection, more perhaps than in any other, that the work of the Inspectorate might with advantage be reviewed. Whether or not there is need, at the secondary stage, for 'inspection,' as a guarantee of efficiency, whether or not the time and energy of these, presumably, expert students and exponents of the art of education should be expended on the mechanical processes of examining, it is very clear that a large and fruitful field of research into the methods and techniques of teaching would lie before them if they were able and willing to undertake it. The advisory duties which ought to be the main task of an inspector cannot be discharged adequately unless there exists not only an approved and thoroughly established set of principles, but also considerable agreement regarding the details of their application. It ought to be the special duty of such advisers to initiate, direct, carry out, co-ordinate and apply the results of all such investigations, just as some of them, even now, try to co-ordinate and broadcast the best opinions and practices which they hear about and see. Moreover, to assume that present practices are adequate and that no advance is possible is to ignore the fact that education must change with the needs of the times.

It is surely unwise that research into better methods and techniques should be left to those comparatively few teachers and students who, in the midst of many other complex duties, contrive to find time to pursue some problem of special interest to themselves. The University Training Departments and organisations such as The Scottish Council for Research in Education have done much valuable work through voluntary workers, but they cannot deal with all the problems that arise, nor can they systematically explore the foundations of progressive development in education. That must be done in the field where such ideas are tested and used, viz., in the schools; moreover, to avoid overlap it should be done by whole-time investigators working to a common plan, who, when their findings are ready, have the opportunity and power to make them known throughout all the schools of the land.

Commissions and consultative committees, whether constituted of experts or of ' intelligent amateurs,' can only deal with general policy or with general principles, and even these, too often, they derive from collections of opinions which, in the absence of careful and controlled research, may even be misleading and wrong. This is not to say that collected opinions have no value, but it is very often true that a unanimous opinion merely represents a problem as it appears to the people who have expressed the opinion and not as it might appear when examined by suitable research methods. It follows that the complicated and somewhat delicate machinery required to convert the general policies and principles of education into effective classroom procedures is not a matter for large-scale committees, except in so far as they can inspire or direct the activities of those research workers through whose efforts alone the information needed to secure progress can be obtained.

Is it too much to suggest that a National Department of Education should concern itself with the improvement of school organisation and classroom procedures much more through the direct methods of comparative research than through the indirect methods of examination, inspection and official circulars? And may not the opinion be ventured that officialdom seldom appreciates fully the inhibiting effects of its own regulations, and that if inspectors and administrative officials would themselves try to evolve progressive procedures within the framework of their own regulations, they would not be surprised (as they often appear to be) that teachers do not display greater enterprise in making use of the considerable freedom to experiment and to adapt which they are supposed to enjoy?

Such freedom to develop one's own ideas is really much more limited than it seems, and when the central department looks for progress through the activities of able and inspired teachers, persons to whom teaching is a *vocation* and whose interest in their work is supposed to express itself in enlightened efforts to advance the method and technique of education, it leaves to accident and chance what should result from systematic and ordered inquiry. The insight and skill of individual teachers is not enough in itself. Too often it is a groping after truth in circumstances made unnecessarily difficult by uninspired and even hampering direction from above; too often it fades out through lack of encouragement, help and support at the right moment.

Teachers, naturally, desire to be free to develop their knowledge and skill to the fullest extent, but the interference they dislike does not come from inspectors or education officials but from persons whose real interest in education is as limited as is their knowledge of its procedures, aims and methods. Teachers, generally, do not object to informed guidance; on the contrary, they welcome it. When they leave the training colleges they are ready, even anxious, to apply their recently acquired ideas; but when they find the school conditions so different from what they expected, and their own resources so limited, they are liable to fall into an established routine from which as the years pass it becomes increasingly difficult to escape.

The creation of an active central department, staffed by persons experienced in classroom problems and trained in research, charged with the task of establishing and disseminating progressively developing procedures of education for all levels of ability and at all stages of growth, would not therefore reduce the initiative of individual teachers or dull their enthusiasm. On the contrary, it could, and should, foster their interest by enlisting their active co-operation in research inquiries, thus providing opportunities for its creative expression. Such co-operation, however, should not be thought of in terms of the repetitive tasks of marking scripts, entering up marks and applying statistical formulæ. The teacher should be an acceptable and accepted member of the research team investigating a problem; he should never be expected to be content to act merely as a convenient collector of data whose services are limited to the more or less routine or mechanical tasks; he should be fully informed about the procedure and methods and should be allowed to contribute any suggestions, experience or data which may help to elucidate the problem.

Now, the complete carrying out of the studies described in the earlier part of this chapter and their further and better development require a great deal of this organised research. At present the progressive ideas of individuals are expressed at conferences, in journals, in books and even in school textbooks, but, at best, to only a limited audience. A good idea may gain adherents and gradually spread; on the other hand, it may be lost in a morass of indifferent or bad ideas. In any case, by what criterion is it to be judged a good idea? Who is the final arbiter? Apparently, any teacher who likes an idea and wants to use it is considered a satisfactory judge, for the central department has consistently shown a curious reluctance to express a definite opinion on the merits of alternative plans, ideas and suggestions. If the question is a big one, involving policy or principles, it refers it to an advisory committee, whose final compromise, representing no particular opinion, may be of no use to anybody.

In the matter of textbooks, at any rate, research clearly is better than opinion, for while many textbooks express one or more good ideas, there are few textbooks which contain all the good ideas. It is as unnecessary to go into the reasons for this as it is to repeat that a central research body could, after trials and tests, construct and distribute syllabuses, notes, exercises and texts containing all the best ideas, and that teachers could share in this very necessary work.

In short, their inquiries ought to be directed specifically towards establishing co-ordinated schemes of work in the use of words (Linguistic and Literary Studies), in the examination and classification of the facts of everyday life (General Science), in the elucidation of the principles of measurement and in the methods of their use (Mathematics), in the application of all such facts and principles in occupational and recreational pursuits, and in the acquisition of skill in the use of tools (Handwork and Art). The existence of individual differences in learning capacity imposes the further task of constructing in each of these main groups of activity at least three, and possibly more, separate programmes of work graded in difficulty and capable of further subdivision to suit individual requirements. No doubt a large number of the facts, items, exercises and tasks employed in these schemes of work will be the same for all pupils, but there will be important differences in the ways in which they are approached, explained and supplemented as well as in the speed with which they are apprehended and applied. It is by no means certain that at the secondary stage these differences are sufficiently understood; if they are, it is unlikely that they are suitably and adequately provided for, because, as yet, the school life of the majority of pupils ends at fourteen. But when the school age is raised to sixteen a very different problem will exist, the solution of which was provisionally outlined in Chapter V. Bearing in mind what changes in the co-ordinated schemes of work will be required to give effect to the proposals there made, we may now turn to the final stage—fifteen to sixteen—and consider what effect the choice of an occupation can be allowed to have upon it.

CHAPTER VII

FROM FIFTEEN TO SIXTEEN PLUS. EDUCATION FOR EMPLOYMENT

It was suggested in Chapter V that a suitable concentration of interest and effort on a selected group of school activities between the years thirteen and fifteen might lead to a valuable development of the special abilities of the individual pupil. Then, in Chapter VI, an outline was given of the way in which the subject-matter of instruction might be analysed, selected, co-ordinated and arranged so as to contribute substantially to the achievement of the same aim. Now the problems of the final stage, from fifteen to sixteen plus, must claim our attention. These are twofold; on the one hand, they are concerned with the clearer definition of the individual's vocational ambitions and with the provision of educational media suitably related to them; on the other, they are connected with his general preparation for good citizenship and with the process of fostering to the highest degree his moral and physical well-being.

The second of these objectives, since it must continue to be developed through the various social and group activities of the school, requires no detailed discussion, for the value of a fully co-operative membership of a 'live' society is admitted by everyone. The only debatable question from the point of view of the secondary school is whether the strong claims of the intellectual or the practical activities to dominate the individual's general education during this period would justify a concentration of attention on these at the expense of the physical, moral and social aspects. The answer, we may suppose, will always be that each should receive its proper and necessary share, but that if any aspect of education is to be particularly favoured at this stage it should be that which comes through social and group activities rather than through books and tools. Nevertheless, the problem is not quite the same for all mental levels, and this general answer will require some qualification in particular cases.

The solution proposed in Chapter V, based upon an extension of the school-day, was that one-fourth of the time available for formal educative activities should be devoted to those concerned with the individual's physical, moral and social development, leaving three-fourths for the needs of selected intellectual and practical activities. This was thought to be just sufficient for the latter purpose, without encroaching on the pupil's out-of-school time; but it is little enough, and any further demands for organised education, social or intellectual, must be met in other ways.

There is clearly no need to consider any additional activities for pupils under fourteen (and, perhaps, even under fifteen), because the existing claims of home, hobbies and junior clubs can absorb all the individual's remaining time and energy. Nevertheless, to prevent undue waste of interest and time at the cinema or on the streets, membership of junior groups may have to be initiated and encouraged. It is, however, for the boy and girl between fourteen and sixteen that the need for evening occupations which are more recreational and less formal than those of existing pre-training units, and which are arranged and supervised by responsible people, is most marked. The need is great, even now, for the young people who have left school; it will remain when their day-time occupation changes from business or industry to school.

The secondary school, of course, possesses the facilities (rooms, equipment, etc.) and the necessary basic organisation, but the rest should be evolved from the interests and desires of the young people themselves. Their activities should never be consciously educative so long as the day-school is actively concerned with this aspect; and they should, preferably, be completely dissociated from the day-school atmosphere, attitudes and aims. Where 'youth clubs' do not exist, the secondary school might discharge these functions by providing evening activities which would lead on naturally to 'former pupil' clubs and similar groups. And although the main forms of expression would certainly be found in physical training, games and social activities, the possibility would not be lost sight of that through debates, discussions, lectures, films, broadcasts and the like, the foundations of a continued education, in the wider sense, might be successfully laid. It is to be recognised, however, that the present attitudes and habits of young people do not promise great success for such organised measures. Cinemas and dances claim a great deal of the time and thought of many, and only a few seem likely to respond in the way desired. But we have to consider these questions in relation to the ideas which dominate the present home and social background of children who leave school at fourteen, and which may change considerably if the school-leaving age is raised to sixteen, with all that this implies. Is it not probable that if the school day were made parallel with the working day of industry and commerce the sharp contrasts which now appear between school and work would disappear and that the individual's interest in the continuation of education would therefore persist after the change from whole-time study to whole-time work had taken place? If there were no very marked change in the general ' life situation ' to which the individual must at this point adjust himself, we might find him much more disposed than he has ever been yet, to give a reasonable share of his leisure time to educative pursuits, whether he consciously thinks of them as such, or not.

If good use were made of such informal ' youth ' activities as are appropriate to the fifteen-to-sixteen stage of development, and if continued education after eighteen were effectively coordinated (in all its intellectual, practical and vocational aspects) with the whole-time day school from fifteen to sixteen, and with the evening school and part-time day school (where it exists) from sixteen to eighteen, there would develop very much better foundations for the further processes of adult education than have hitherto existed. At the same time, it is evident that the extended education of the adult as an informed citizen and the social and vocational education of the youth (continuing into manhood and womanhood) are two quite distinct aspects of the problem.

Let no one suppose that, normally, young people of sixteen are ready for, or interested in, philosophical discussion, or the abstract principles of economics or social welfare; they have not sufficient knowledge either of books or of life to interpret everyday affairs in adult fashion, though some of them may be groping towards it. We must not, therefore, be in too great a hurry; nor must we expect too much from ' youth ' movements generally.

One point is, however, certain. Until the individual's vocational ambitions are realised, or on the way to being realised, his dominant incentive to further education is usually the desire to ' get a better job.' This applies to most boys and to some girls, but, for obvious reasons, it does not apply equally to both sexes. The problems are, therefore, rather different for boys and for girls; but for both sexes many interests other than vocational ones may fruitfully be developed. It follows that, by introducing the young adolescent to a sound social and moral environment, by cultivating his taste in music, literature and drama, by encouraging a sincere attitude towards religion and by directing his interest to current affairs, we may hope to bring him, *in time*, to that stage as an adult at which he will desire to advance his own education by every possible means. It will be for the community to see that the means are available.

Some educationists strongly believe that for certain individuals we should try to recapture the spirit, even though we can never restore the practice, of the apprenticeship system of earlier centuries.[1] Prior to the nineteenth century a valuable 'practical' education was always to be derived from the current modes of life of the people. Children were expected at quite an early age to take part in many of the pursuits of the home and of the community. 'Schooling,' at least in the beginning, was largely a means of access to the world of books and literature; training in, and for, the occupations of everyday life was obtained directly *through participation in them.* For the material of 'schooling,' the educators of three centuries ago turned to the classical languages, because there was then hardly any other literature available. It was not only the source from which came the inspiration of the poets and dramatists, but the fountain of knowledge of all kinds. Moreover, when organised instruction was given apart from the study of Latin and Greek texts, it had always a distinctly practical and vocational character. French and Italian were taught for their use in travelling abroad; training in arms and horsemanship was given in the Courtly Academies for the sons of the wealthy; while the apprenticeship system ensured that the sons of merchants and craftsmen were taught the technical details of the trades and occupations which they elected to enter.

The apprenticeship system did more, however, than provide a purely vocational training. "Up to the seventeenth century it supplied the chief means of education in the best sense of the word to a large proportion of English youth; for the master accepted a double privilege, he contracted both to instruct the pupils in the mysteries of the craft and to train them in the right behaviour."[2] And whatever we do about vocational training, this aspect of 'right behaviour' must be retained.

This early 'liberalism' was, however, lost; by the nineteenth century a great change in the organisation of our occupations and in our mode of life had come about. The conditions under which handicrafts were carried on became subject to many abuses arising from the practice of employing children as home workers for extremely long hours. Then came the development of factories, and again child labour was extensively exploited; but the high skill they gained in repetitive tasks did not compensate for the loss of educational opportunities.

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[1] J. J. Findlay, *The Foundations of Education*, Vol. I (Univ. of London Press, 1927).

[2] *Ibid.*, p. 90.

Meanwhile, step by step, as interest in education grew, laws were passed to reduce the hours of labour and finally to abolish the employment of children. While this was being achieved, those who sought to base the welfare of the State on a soundly educated people began to apply to the elementary school, as well as to the ‘ grammar ’ school, those conceptions of a liberal education which had formerly been regarded as the privilege of the children of the well-to-do. The ideal was a man of cultivated taste and of trained intellectual power, an ideal which, we now realise, is too high for large numbers of our children. The opportunities for leisure enjoyed by the bulk of our people have not yet developed at a rate comparable with the improvement in the nature, efficiency and aims of the education provided for them. Hence, although the workers of today live and work under very much better conditions than did their forebears, it has to be confessed that the aims of education, in terms of the culture of a bygone day, and the practical results that it is possible to achieve under the usual conditions of everyday life, are still widely separate. Recent experiences in the evacuation of school children have brought to the notice of many interested people facts which have long been familiar to those who work with, and for, the children of our state schools. The problem of education in our day accordingly resolves itself into one of reconciliation between the apparently, but not necessarily, opposed interests of education for work and education for leisure, including participation both in the social and in the political life of the community.

From fourteen plus to sixteen plus, then, we must encourage the adolescent to take a developing interest in social and group as well as in intellectual activities, and, if necessary, we must provide the opportunities in connection with the secondary school. There are, and will be, numerous difficulties, but they must be faced. With some young people this is a period of strong emotions, of hero worship, of intense enthusiasms and developing idealism, ‘ drives ’ to action which should be tactfully directed into fruitful channels. With others it is a period of introspection and tendency to introversion, of phantasy and day-dreaming, of minor or major maladjustments to the family or social environment, of strong antagonisms to restraining circumstances or individuals, of doubts and hesitancies about abilities and aims. There is impatience with abstract and formal studies, and an idealisation of the ‘ freedom ’ which it is imagined that wage-earning will bring. All these attitudes may need sympathetic understanding and judicious treatment, but, in general, each individual pupil will be helped towards a better understanding of himself and a better adjustment to society if he is invited to participate, voluntarily and not under compulsion, in the activities of suitable groups. These groups should be composed mainly of young people of the same stage of experience and facing the same problems of life. Sometimes the effect of enlisting fundamental enthusiasms is remarkable; pupils who have left school have been known to display an enterprise in astonishing contrast to their previous 'passiveness'; the challenging question is why this energy is not liberated in the cause of *self*-education and used for the welfare of the community. Surely the answer is to be found in the too frequent loss of contact between the school and the external world. A monastic outlook is quite inappropriate in our day.

Turning now to the other major problem—" How should we help the pupil at fifteen to define his vocational aim and to work towards its achievement? "—it may be assumed that during the preceding period, indeed from admission, both parent and pupil have been aware of the general trend of the course of study pursued and its relation to the choice of an occupation. Until fifteen specialisation remained in the background, the particular groups of subjects taken as main subjects being chosen in order to promote the growth of his special abilities; from fifteen to sixteen their further development is to be directed towards a definite vocational objective. What is this to be?

An interview must be arranged with parent and pupil to discuss this matter, for educational guidance now merges into vocational guidance, and if the school possesses an expert vocational adviser his services are likely to be required. His contribution will take into account not only the concrete expression of the parent's hopes and the pupil's ambitions, but a careful study of the latter's school record and perhaps a special examination designed to give information about specific aptitudes not previously required or displayed in school activities.

The decision, whenever possible, should be definite and final regarding the further curriculum, whether or not it be so regarding the occupation eventually to be entered. The nature of these decisions will appear from the alternatives listed below; they will not, as a rule, be very difficult to make. Generally, of course, the longer the pupil intends to devote himself to whole-time education, at school or at university, the longer can the final choice of a career be postponed, though this general statement must be qualified in regard to those professions (Engineer ing, Medicine, etc.) for entrance to which certain subjects are essential. But in dealing with pupils of average and less than average ability, delay in arriving at a decision is not desirable even if, in some cases, it should prove to be unavoidable. By fifteen, the subjects of study appropriate to a D pupil have changed greatly in relative importance. The literary group of subjects (English, History, etc.) has shrunk to modest proportions, and the background of Science and Mathematics has gradually been transformed so that the practical problems of industry and of daily life provide the illustrative material. What remains is a major concentration on the practical and constructional group of activities. These cannot always be selected without reference to occupations; and even if they could, it is better that the vocational incentive should add to the pupil's interest in doing his tasks well. Hence, for the majority of the pupils at fifteen, including some in the A category as well as most of the B,, C, D and E categories, a more or less definite choice of a vocational course of study has to be made. Admission to such a course, however, might very well be made to depend upon the vocational adviser's report and advice.

It may be assumed that the opportunities for employment available to school-leavers of sixteen will be much the same as they are today. The main difference will be that the new entrants to some occupations will have spent two more years in organised school work instead of in part-time or whole-time employment. At present, the employment prior to sixteen has often no connection whatever with the work entered after sixteen. Sometimes it is of the 'blind-alley' type, sometimes an apprenticeship which proves unsuitable, sometimes a succession of jobs, as casually entered as they are relinquished. The employment exchange, in spite of efforts to guide juveniles into suitable employment, can produce examples of all types. The raising of the school age to sixteen, therefore, necessitates a new 'orientation' by employers as well as by parents and schoolmasters.

There are doubtless many who can find something good and even praiseworthy in current methods of employing juveniles who leave school at fourteen; and certainly there are some who consider that children from twelve to fourteen benefit from part-time employment before and after school hours. It will be difficult to convince them that more prolonged schooling will ultimately be beneficial both to the individual and to the community, though proposals on the lines outlined in this chapter may contribute to this. In any case, every effort will have to be made to explain clearly to parents and to employers what the school will seek to achieve and how each interested party must share in the responsibility—the parents by a readjustment to school aims, the employers by getting together to systematise the requirements of training and the preconditions of employment. In particular, the nature and value of specific training for different occupations must be decided. At present, in some industries stress is placed on early beginnings; in others the processes are so special that preliminary training is considered to be valueless, even harmful when it is inappropriate or when wrong methods or movements have become habits. Employers will have to reconsider these and other matters in the light of the changes caused by raising the school age; if they are unable to arrive at decisions without systematic investigation, the necessary inquiries should be initiated as soon as possible.

Studies in the selection of workers for different branches of industry have shown how the abilities needed for particular kinds of work may be discovered, and it is not difficult to see how the psychological analyses preliminary to the construction of suitable selection tests may contribute usefully to the solution of the problem of the vocational guidance of the fifteen-year-old boy or girl.

In urban districts the available occupations are many in number and varied in kind, but in rural and mining areas the opportunities for employment are those provided by the main local industry. Everywhere, however, the abilities of the available young people vary, as we have seen, over a wide range; and as their possessors will eventually be free to move from place to place and to find employment anywhere, it is evident that the school's concern is not so much to fit its pupils for the employment available locally, as to equip them, as best it can, for the fullest use of their abilities in the most suitable occupations, wherever these may be found. This involves a consideration of the vocational opportunities available everywhere to all adolescents of similar abilities, and not merely a study of local conditions. In a completely state-managed system, with soundly conducted surveys and good planning, it ought to be possible to direct the educational activities of different regions so that there could be a reasonable degree of equivalence between the number of young people preparing for a particular occupation and the number likely to be required in it. The employment exchanges have had considerable experience of recording and assessing employment requirements, and if sound estimates were made available, quarterly or half-yearly, vocational guidance at fifteen or sixteen might be related quite effectively to national, as well as to local, needs. In the organised professions, such as medicine and teaching, the need of this kind of foresight has long been recognised, and, to some extent, has been met; it does not seem impossible to extend the principle to the majority of trades and occupations, and especially to those in which machinery already exists for controlling the admission of apprentices. It might be advisable, of course, in stating national needs, to indicate regions in which the need exceeds the supply, and *vice versa.*

The success of any scheme of this kind rests ultimately on three things: an adequate survey of the occupations to be entered by young people at sixteen, seventeen or any later age, a scientific statement of the abilities required for their successful performance, and a re-examination of the content of school studies to see how these abilities may best be developed. Much of this work has yet to be done, but we are not without some guidance in these matters, and we can see the general lines along which these inquiries should proceed.

Occupations can be classified in various ways, but the most useful is that based on special abilities. Classifications hitherto attempted by estimated general intelligence are of limited usefulness because, at the lower levels, this measure of ability plays a relatively small part in vocational success and causes the classification to become inexact and unreliable. Unfortunately, although numerous separate studies exist, we have no systematic account of the abilities needed in different occupations so arranged that the elements common to different types of work can be abstracted and described in terms helpful to the schoolmaster. Much general, and some specific, guidance can be obtained from the reports of the National Institute of Industrial Psychology.[1] Oakley and Macrae [2] give estimates of abilities required in higher occupations, but in order to direct a pupil's specialisation along sound lines it will also be necessary to know what abilities are common to the skilled manual occupations, from mining, fishing and agriculture to manufacturing, from working in wood, metal and other materials to transporting and distributing the finished products. In the scheme for differentiating studies, described below, such knowledge as can be gleaned from numerous unrelated sources has been used, but it should be regarded as only a first step towards the desired solution.

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[1] Listed in *Occupational Psychology*, the *Journal of the National Institute of Industrial Psychology* (Aldwych House, London, W C.2).

[2] Oakley and Macrae, *Handbook of Vocational Guidance*, 1937 (Univ of London Press, Ltd).

Some help may be gained from an analysis of the programmes of work in continuation and evening schools, for these do express in some degree the theoretical and practical aspects of the occupation—plumbing, building, cabinet-making and so forth—upon which the future success of the apprentice is likely to depend. But since the instruction, intended as it is for persons already apprenticed to the trade concerned, is often formulated in terms of the activities of the trade, any common elements except those characteristic of day-school work, such as arithmetical operations, algebraic formulæ, geometrical truths, etc., are hard to discern.

Again, in London and other large centres of population there are, in addition to the junior technical schools, special trade schools giving a specific vocational training for trades such as dressmaking, printing, upholstery, catering (food) and the like. Their pupils seek and, if successfully trained, will be helped to find, employment in the trade selected; consequently the training is highly specific and, when combined with sound selection of trainees, very successful. A similar concentration on specific training is seen in the Army technical schools for boys (fifteen to eighteen) and in Borstal Institutions, but the procedures are not directly applicable to secondary-school problems Nevertheless, there is something to be learnt from a study of their aims and methods.

Another possible source of information is to be found in those junior technical schools concerned with the engineering trades, for here the training is, on the whole, less specific than in the trade schools, and is not directed specially towards the training of particular types of apprentice (though differences will no doubt emerge). Unfortunately, the methods of selecting pupils for admission to such schools have often proved to be unsatisfactory, so that the question of the suitability of the instruction given and the degree of skill attained is complicated by doubts as to the suitability of the trainees. It appears that many entrants do not complete the course and that, even when they do, they enter clerical and other occupations instead of engineering. This may, however, be the result of giving the training in a specialised institution (whereby the errors of admission are multiplied and the possibilities of correction reduced), rather than of making the course of study insufficiently specific for some and too specialised for others.

Commercial education, it may be mentioned in passing, is a judicious mixture of the general and the specific elements of training. Its connection with the secondary school may be seen from the details given regarding Course *a* (iii) for B pupils (page 148). While the abilities of those who *should* take a commercial course have much in common with those who *can* take a literary-linguistic course, they have very little in common with the abilities needed in scientific or technical subjects. There is, therefore, less reason to claim that the teaching of commercial subjects requires a separate type of school. It has, and should have, a legitimate place in the secondary school we are considering, but the specific elements in this, as in all other cases, should be kept for the later stages of the curriculum.

It is evident, then, that although we may obtain useful information from all these sources, we shall be obliged, in the end, to express for ourselves the connections between abilities and occupations in terms of school activities suitable for boys and girls of thirteen to sixteen. But when we set out to do this we observe that, as their interests and attitudes differ at all stages, the problems of boys are different from those of girls. It may be true that these differences are not so marked at eleven plus as to require separate consideration, but from twelve to fifteen the sexes develop at different rates, both physically and mentally. This is recognised in existing arrangements by which characteristic modifications of curricula are provided in the commercial, domestic and technical groups of subjects. In academic curricula, however, it has been frequently assumed, especially in the typical Scottish senior secondary school, that no such differences need to be considered, common aims and methods being applied throughout to both sexes. In so far as university entrance examinations constitute a standard of attainment which both sexes must eventually reach, the procedure seems to be justified with girls who wish to take a university course. On the other hand, it is pertinent to ask whether the same objective must be reached by the same routes, by the same means or at the same pace. And there is no doubt whatever that for the great majority of boys and girls who do not intend to go to a university different procedures are desirable. But if we attempt to say what these should be, by considering the special abilities of the sexes, the awkward problem of equality of vocational opportunity arises. It may not be difficult to imagine a social order in which the tram drivers, domestic servants, shop assistants, street cleaners, postmen, railway porters, etc., etc., include men and women in equal numbers, but in spite of women's achievements in wartime there do remain occupations which appear better suited to men than to women and *vice versa*. No doubt the lines of demarcation have now become somewhat blurred, but the underlying factors, physical and mental, temperamental and vocational, still remain. The question affects our school problems just as it affects society in general. If, for example, highly specialised training in mechanics is suitable for girls with aptitude for engineering, then preliminary training in cooking, laundry work and housewifery ought to be equally suitable for boys who desire to become chefs, cooks, waiters or caretakers. The numbers in these somewhat unusual categories may, eventually, prove to be small, but if they exist at all they are part of the general secondary school problem and cannot be ignored.

Perhaps the most satisfactory way of dealing with this problem is to decide what provision should be made for the main interests and vocational aims of boys and girls taken separately. There will then be some overlap, some common ground, which both sexes may share, and perhaps also there will appear groups of activities especially appropriate for each, as, e.g., fine needlework for girls and work in wood and metal for boys. But it must be confessed that our ideas regarding these differences may undergo radical changes during the next few generations. If, therefore, we proceed, as we must, according to current distinctions, it is advisable to state frankly that while we seek to distinguish between the activities most appropriate for boys and those most appropriate for girls, we are prepared to make each freely available to the other.

A preliminary classification of occupations is given on page 147-8. Working back from this to the school curricula outlined in Chapter V, it is possible to plan a series of specialised programmes of work suitable for most of the individuals who desire to start their occupational life at sixteen. The bare outlines of these are shown together in the table facing page 148. The details are briefly discussed in the subsequent pages.

PRELIMINARY CLASSIFICATION OF OCCUPATIONS AS AFFECTING THE SECONDARY SCHOOL

(1) Professions and occupations requiring as a preliminary qualification a university degree or a diploma from a recognised institution of higher education.

(These need not be mentioned in detail. They are familiar to all schoolmasters.)

(2) Professions and occupations demanding as a preliminary

qualification a School Certificate and usually requiring some form of continued education in addition to the training obtained during business hours.

Accounting.
Architecture.
Army, Navy and Air Force.
Banking.
Civil Services (including Post Office).
Commercial offices.
Domestic science and institutional management.
Hospital work.
Law.
Local Government offices.
Massage and similar occupations associated with medical treatment.
Municipal Services.
Nursing—general and special.
Radio technicians.
Public Services (including Police).
Surveying, etc.

(3) A partial list of a number of trades and occupations which cannot be classified by Certificate requirements because different degrees of knowledge and skill may be used within the same occupation. There is an interesting parallel between the two lists suggesting that sex differences in occupations may not be so great as is often supposed.

Boys	*Girls*
Clerks.	Secretaries—Literary work.
Bookkeepers.	Shorthand-typists.
Shop assistants.	Cashiers and shop assistants.
Postmen and policemen.	Policewomen (Postwomen).
Printers.	Bookbinding and stationery.
Watchmakers, radio mechanics and instrument repairers.	Jewellery makers.
Hairdressers.	Hairdressers.
Electricians.	Window decorators.
Fitters and general mechanics.	Cooks.
Plumbers.	Laundry workers.
Smiths and sheetmetal workers.	Nurses.
Joiners and cabinet makers.	Light woodwork.
	Needlecrafts — dressmaking and millinery.

Boys	*Girls*
Upholsterers and french polishers.	Upholsterers (french polishers).
Brush and mat makers.	Brush and mat makers.
Weavers.	Weavers.
Painters and decorators.	Painters and decorators.
Plasterers and bricklayers.	Florists.
Slaters.	
Miners and quarry men.	
Factory workers (various).	Factory workers (various).
Gardeners and farm workers.	Gardeners and farm workers.
Bakers and confectioners.	Food preparation and serving.
Fishermen.	Dairymaids.
Shoe repairers.	Domestic servants.
Firemen or boilermen.	
Caretakers or janitors.	Caretakers and cleaners.
Packers, warehousemen or porters.	Packers.
Delivery cart or van.	Delivery cart or van.
Municipal workers (roads, dustmen, etc.).	

The main outlines of a suitable school organisation are given in the accompanying table, but they need some explanation and amplification.

The underlying principles are:

(1) Special abilities (classified as *a* (i), *a* (ii), etc.) may be developed in different degrees of strength at all mental levels except the very lowest.

(2) General education from twelve to thirteen should be followed by a re-grouping of subjects between thirteen and fifteen, whereby the individual's stronger abilities are given more scope to develop.

(3) From fifteen to sixteen stress should be laid on the vocational ambition, and this may require an altered programme of work. Generally, pupils of superior ability who require high *theoretical* qualifications will continue the same subjects to a higher stage; pupils of average or less than average ability who will eventually need more *practical* qualifications may now direct their studies specially towards the occupations they desire to enter.

(4) A definite qualification, badge or certificate should be the goal of every pupil and should be awarded for the successful completion of an acceptable programme of work—general or

Category b General Abil	Occupation from 16 to 18
A M.R. 120	n for University Entrance, for other ons of higher education and for profes- aminations courses of one or two years for professions ations which do not require degrees or , e.g. hospital nursing
B M.R. 106–1	enticeship to the following: ice work—law, bank, commerce, shipping ice work—newspapers, libraries ice work—general, or shorthand-typist oratories and works, Meteorological ffice, map-making gineering workshops, gas works, electricity rks, etc. ounting, bank, business office, works office ineering workshops, drawing office, sur- yor, architect, etc. sing (pre-entry training), domestic science ic, art, architecture, shopwork

entrants to such occupations mainly to C (and sometimes B) pupils. Consequently, the need for a special certificate (in place of the general certificate) for pupils in categories D and E is very strong. No very definite statement regarding the qualifications for employment of the school-leaver of fourteen who has little skill in writing or figuring has ever been possible on school records alone, and the various causes of this will not disappear merely through the raising of the school age. But, as already suggested, if we give each pupil a definite practical goal within his capacity, the desire and effort to attain this will be more likely to keep him happily and successfully occupied until he can enter employment at sixteen. If the pupil should find himself unable to reach the standard required for a special certificate in six months, he should still have time to do so in twelve months. A certificate so obtained might become a very acceptable qualification for employment, especially under the conditions suggested above—viz., that the choice of any certificate course follows the advice and examination of a trained adviser, and that all certificate courses are carefully planned to constitute a sufficient and satisfactory link between the earlier general education and the occupation to be entered.

These proposals for certification may appear to some to emphasise unduly the examination side of the secondary-school programme, but it should be remembered that we are here considering only those aspects of the whole programme which are mainly concerned with vocational preparation. We have set aside for social and other activities not only one-fourth of the day-school time, but also the whole of the remaining available time. Certificates, therefore, are not the only aim, even though, from the very nature of things, they must always play an important part in determining qualifications for employment. Our purpose in providing certificates within the reach of those who, at present, never qualify for any certificate, is twofold: firstly, to satisfy the indispensable need for an objective which it is possible for them to achieve; and, secondly, to establish the organised activities of the secondary school as an integral part of a comprehensive programme of education covering the whole period from school entrance at five through the secondary stage beginning at eleven plus to full adult membership in a trained and educated community.

The nature of the subjects taught and the standards of the examinations set will, in all cases, be determined by reference to the needs of the adolescent between sixteen and eighteen. With the A and B groups, the requirements of selected examinations being the objectives, the main and cognate subjects will be chosen accordingly. There will be few, if any, difficulties, because the secondary schools have been doing this for many years. Nevertheless, there will also be a place for differently organised courses of study of a pre-entry type for those who remain at school until seventeen or eighteen. Nursing, for example, might have its own special pre-entry course. With the C, D and E pupils, however, much new ground must be broken. Each occupation in which there are well-defined requirements in ability, knowledge and skill must be studied and the nature of the best pre-entry training determined. This must then be translated into suitable secondary-school procedures, but not, as hitherto, with over-emphasis on the academic and theoretical aspects.

It will be apparent that the facts and items, tasks and exercises, which constitute any particular programme of work will, in some respects, overlap with those of other programmes. If, therefore, we can select and arrange these facts and exercises in such a way that they allow for flexibility in group instruction and group direction, while providing for individual needs, we shall have the kind of organisation required to achieve our aims. Complete success, therefore, entails the full co-operation of parents and employers, very careful analyses of occupational requirements and considerable skill in assembling the elements of experience (common or diverse) into coherent and intelligible wholes. The labels, or names, used in the classification on page 148 will be meaningless without precise definition, but it is impossible here to do more than indicate the lines along which such definition might proceed. A few examples must suffice:

1. *The Clerk's Certificate* (*one year*)

In addition to a general certificate (pass standard) consisting perhaps of English Language and Literature, and History-Geography as the main subject groups, of Logic and Practical Measurement or Natural Science as a cognate subject and Art or Music as a subsidiary subject the apprentice clerk should have a Special Certificate course consisting:

(*a*) for boys, of Writing, Composition, Spelling, Précis, Bookkeeping, Commercial Arithmetic, Shorthand, Business Economics,

(*b*) for girls, of Writing, Composition, Spelling, Précis, Shorthand, Typewriting, Business Economics, Commercial Arithmetic and Bookkeeping.

2. *The Electrician's Certificate*

In addition to a general certificate (pass standard) consisting perhaps of Physical Science and Mathematics as the main subject groups, Technical Drawing and Applied Mathematics as the cognate subjects and English with Literature *or* History with Geography as a subsidiary subject, the apprentice electrician should have a Special Certificate course consisting of:

Electricity (heat, light and power)—cells, batteries, dynamos, lamps, cables.

Use of instruments—ammeter, voltmeter, etc., blue prints and wiring diagrams.

Practical work—soldering, jointing of wires and cables, making holes in materials, conduit (piping), elementary testing for faults.

Technical drawing—applied to electrical work. Construction of buildings.

Mechanical science—engines, power.

3. *The Painter's and Decorator's Certificate*

No general certificate would be demanded (though of course an appropriate choice of subjects from thirteen to fifteen is implied).

Special work might include:

Colours, media and their uses. Oils, dryers, etc.
Colour mixtures and effect.
Chemistry of common substances used—solvents, etc.
Practical work—lettering, lining, pattern, block printing, etc.
Practical use of Art forms. Large and small brush work.
Associated wood and metal work.

4. *The Handyman's Certificate*

Various special courses under this name could be devised. The activities included would be essentially practical, but nevertheless judged worthy of serious study by the pupil choosing them. The following are suggested examples:

(*a*) Preliminary training as a steward or man-servant—cleaning, repairing and pressing clothes, care of cutlery, plate, linen, etc., packing, shopping, use of telephone, shoe cleaning and preserving, sewing buttons, darning socks, etc.

(*b*) Preliminary training for the work of a caretaker or janitor—sweeping, window cleaning, care of floors, walls, etc., requiring use of different materials and methods, care of woodwork, paintwork, ironwork, care of radiators, fires, etc. Simple book-keeping, taking stock, making reports.

(*c*) Preliminary training for the work of a furniture repairer and remover—repairs to upholstery, mats, furniture, etc.

Abundant opportunities for practical work of this kind are to be found in every school, while the necessary instruction can be shared by the different departments specialising in Art, Crafts, Science and the like. Although the supervision of these simple activities will be largely individual, the instruction need not be; indeed, the understanding and proper carrying out of printed directions should form an important part of every individual's training. This implies, even for the handyman, that the ability to read with comprehension has received adequate attention at the earlier stages

This outline sketch of an organisation capable of meeting the needs of all secondary-school pupils in the future may not win universal approval, but at least it is practicable. It can be operated whether schools are organised on a selective or on a multilateral system, though obviously it can be applied more effectively on the latter plan. It is not essential that the specialised vocational training should be given in the same buildings or by the same teachers as the preliminary training, though there are good reasons why the pupil should remain a member of his school group and continue to share all other activities with the pupils with whom he has previously associated.[1] If, therefore, it were found necessary to send the pupil at fifteen or fifteen and a half to selected trade or vocational schools for a large part of the day, the rest of his education should still be focussed on the secondary school to which he belongs and which also would be responsible for his general welfare and progress. Having regard, however, to the considerable overlap which is likely to exist between different specialised courses, there seems to be a good case for their centralisation in the secondary school itself, which means, in fact, that the greater flexibility of the multilateral form of organisation is a very strong argument in its favour.

It may, and probably will, be objected that this scheme is too elaborate and complex, that grouping for instruction will be very difficult to arrange, and that few existing schools have the necessary resources for putting it into effect. The answers to these objections are: first, that human needs are complex and that we have not hitherto attempted to provide sufficiently for them; secondly, that the difficulties will disappear before a determined and enlightened attack; and thirdly, that a considerable expansion of secondary-school resources will be necessary no matter what plan of reconstruction be attempted. Difficulties much more serious than these will arise from lack of knowledge regarding the measurement of special abilities and from inadequate and inexpert guidance procedures. Effective differentiation at fifteen implies an accurate knowledge of the individual and therefore improved procedures of observation and examination. The form these should take is outlined in the next chapter.

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[1] Cf p 12 (Chapter I).

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CHAPTER VIII

GUIDANCE PROCEDURES

It was suggested in a previous chapter that vocational guidance should be regarded as the completion of a process of educational guidance which begins when the child enters school and continues throughout his school life. His programme of studies will be organised accordingly as a means to several ends, which jointly embrace the whole development of his personality. In so far as a happy and successful adjustment to life must always involve the vocational problem, this cannot be kept entirely apart from the work of the school, and the incentives derived from it must be allowed to irrigate what might otherwise become the dry and arid desert of a meaningless preliminary education. Our purpose in this chapter, as in the last, is not to emphasise vocational aspects at the expense of others, but to describe practical procedures through which they may be utilised to the best advantage.

The first step is to enlist the full co-operation of parent and child, and means of securing this have already been considered. The next is to collect adequate and reliable information regarding the pupil's mental and physical 'make-up.' The beginnings of this process, in connection with the pupil's admission to the secondary school, were sufficiently described in an earlier chapter, and the problem now before us is to decide how this particular information can be most effectively supplemented and completed during the secondary stages.

The plan outlined in Chapter V calls for two decisions, one, after one year, at about thirteen, the other, after three years, at fifteen. The first, concerned with the choice of the main and cognate subjects to be studied, is entirely an educational one, though it will eventually have an important bearing on the vocational choice. Two additional sources of information should now become available, the pupil's record of the first year and the results of special tests of ability.

The school record, if the subjects have been suitably coordinated, will provide evidence of developing abilities in the three main branches of intellectual and practical activity. It has frequently been demonstrated that there is a consistent relationship between first-year marks in a subject and subsequent progress in that subject, and if this occurs when the conditions of school work hinder rather than help the development of a fully integrated body of knowledge, it seems likely to occur with even greater constancy when the abilities required in the linguistic-literary group or in the mathematics-science group or in the constructive-artistic group of school studies systematically reinforce each other. For the subject groupings proposed will undoubtedly help the individual to express his abilities more precisely in those activities which attract him, and so will give greater significance to his mark or rank in the subject group as a whole.

Special tests of ability should be used to provide additional information, confirming or contradicting the evidence of the first-year record. If there are discrepancies between these two sets of data, further study and investigation will be needed to remove them, but the time required will be well spent if it removes the possibility of misfit at a later stage. The measures of ability to be employed need not be highly specific; it will be sufficient if they can distinguish between the main abilities developed by the subjects to be studied during the two years from thirteen to fifteen. The fact that subjects can be grouped according to ability to deal successfully with verbal material, with mathematical and scientific problems, and with the making of objects indicates the nature of the tests needed, for these are the abilities most likely to be required during the next stage of education. The tests of ability for secondary-school courses already described provide a useful starting-point for this kind of inquiry, but much more investigation will be needed before we have suitable tests for the *end* of the first-year stage.

In so far as these particular tests have been shown to correlate with subsequent success they can be used in connection with this problem, provided they are given, as intended, on the pupil's admission to the secondary school and not after one year's work. For use at the end of the first year they would have to be re-standardised, labour which would be better spent in the preparation of an entirely new set of tests. (The preparation and validation of a test takes so long that when it has been standardised it is better to use it, in spite of its obvious imperfections, than to spend time in reconstructing it.)

In this connection it may be pointed out that the abilities measured by these tests are probably more easily detected and measured at the earlier stage than the later one. The results of the Fife experiment in vocational guidance[1] bring out this point quite clearly, so that it will not be surprising if further research suggests that the best technique is to give the broader ability tests early. Perhaps the end of the first year may not be too late for measures of ability in the Use of Words and in Mathematics, etc.; while for measures of constructive and artistic abilities, it may also be soon enough, because the activities in which they are to be applied are relatively more specific.

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[1] *A Vocational Guidance Experiment in Fife.* N.I.I.P. Report No. 6.

It would appear, then, that with the aid of tests of this kind and records of first-year work we ought to be able to say with considerable accuracy which pupils have the ability to make linguistic and literary subjects their main interest, and which have the corresponding aptitudes for Mathematics and Science. But we do not want to select those who are to make constructive and artistic pursuits their main school programme solely by a process of elimination from other groups. It has been emphasised before that the absence of one ability does not imply the presence of another ability. The choice of any subject group should be based upon positive rather than negative considerations.

Fortunately, there are measures which might, under suitable conditions, supply helpful information. Among them may be mentioned:

(1) A test of ability to deal with a practical situation. In some vocational guidance investigations Healy's Picture Completion Test II and the Porteus Mazes have been used, but there are others, including non-verbal pencil and paper tests.

(2) A test of ability to understand simple mechanisms.

(3) A test of ability to recognise form relations.

(4) A test of memory for shapes and designs.

(5) A test of colour discrimination.

The first two are usually given individually, but the others can be administered simultaneously to groups of children. 'Non-verbal' tests which might be useful substitutes for the first mentioned are also available for group application.

These suggestions are based upon the results of the Vocational Guidance experiment carried out in Fife from 1928 to 1934, and upon subsequent experience. It would appear that the abilities involved in highly skilled activities are likely to be of late development and are measured with greater consistency at thirteen or fourteen than at twelve. Therefore, it does not seem profitable to examine pupils in much detail soon after admission regarding practical abilities (except that by so doing the needs of research can be provided for, and the validity of practical testing methods established).[1]

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[1] See p. 132.

Results derived from the use of tests of constructive or artistic ability, comparable with those given for tests of linguistic and mathematical abilities, are not available, but a study of Tables XV to XXVI of the Fife Report should convince the reader that large individual differences exist in a great variety of practical activities and that the accurate determination of these differences has considerable significance in both educational and vocational guidance. The time required for these additional measurements is not excessive, having regard to the importance of the decisions to be made. Thus, if the pupils are tested in fours or sixes, the individual tests can be given to 100 pupils in three or four days, while the group tests can be administered in as many hours. Moreover, it would not be necessary to employ these additional measures with all pupils (unless, as before mentioned, for research purposes); their chief use would be to confirm, or deny, the supposition that a pupil who has shown no pronounced linguistic or scientific abilities and who desires to specialise in constructive or artistic activities does, in fact, possess the necessary natural endowment. If his school record and the tests both indicate a relative lack of ability in these, as in other, directions, we know exactly what our problem is, and whatever solution we may propose, it will not be rendered inappropriate through incomplete or incorrect information.

So much for the method of obtaining the information required for our first decision. What use are we to make of it? The problem is to choose a curriculum for the two-year period from thirteen to fifteen; and we have already outlined the alternatives appropriate to pupils of particular abilities (page 148). With this general plan before us we can help the pupil and parent to choose wisely.

The connection between each programme of work and subsequent occupational opportunities and requirements will have to be clear to the adviser, so that he can, when necessary, explain to both parent and child. In all cases, however, agreement when reached should express complete understanding of, and acceptance of, the implications of the decision. It should also be recognised that change of programme between thirteen and fifteen will not be easy to make, and will only be advisable if conditions change greatly, such a change, for example, as might be caused by insufficient progress in the desired direction, or, more rarely, perhaps, by the development of a new ambition supported by clear evidence of appropriate interest and ability. In short, it is expected that the decision at thirteen will have to be revised in exceptional cases only, and it is to ensure this that so much care should be expended upon it.

The stage at which *specific* vocational guidance will be required is at fifteen, when the question of preparing for special certificates qualifying for occupations will arise. The practical question, now, for most boys and girls, is how to choose and to prepare for a suitable occupation. This is *vocational guidance* as usually understood, and a big responsibility falls on the adviser as well as on the parent, on whom the final decision rests. Again, the solution must be a joint one, acceptable to the parent and child as well as to the teacher.

The choice must be derived from:

(i) the school record (three years),
(ii) the pupil's ambitions and the parents' wishes,
(iii) carefully devised selection procedures.

The school record covering three years must, for almost all pupils, be highly relevant. If our previous selective procedure has been successful, and our differentiated courses suitable, we ought to have a large number of records in which the pupils have displayed a steady development of their strongest abilities, along with corresponding progress in cognate and subsidiary activities. These positive achievements will form the starting-point of further inquiry or the nucleus of a practical suggestion. How different from the common experience today, when for so many the vocational choice seems to consist of trying their luck in some new direction because they have conspicuously failed in others! Leaving school too early is one of the manifestations of this attitude: for it is certain that many pupils would remain longer if they did not feel more or less of a 'misfit' in the classroom activities.

The relation between the previous course of studies and the curriculum for the fourth year will, of course, appear closest for pupils in the A and B categories who wish to enter a profession. Their work during the next stage (and subsequent ones, if attempted) is the direct continuation of the work of the previous stage. But the vocational incentive is there; it always has been.

On the other hand, the pupil who ceases his general course to specialise as an electrician, decorator, handyman, etc., finds that his course of study has to become much more specialised than it was before. He has to develop certain manual and bodily skills which require intensive practice; he has to learn the 'why' as well as the 'how' of the various practical procedures demonstrated to him. But since these are so obviously related to what he wants to be when he leaves school, he does not consider them dull, and rather enjoys them. Moreover, if the work of the two previous years has been well selected and presented he will probably find himself *able* to do them; and if ability and enjoyment go together, success is assured.

The abilities which have been developing during the previous three years and which are directly expressed in the quality of the pupil's work at the age of fifteen will not require to be re-examined and assessed. They will be sufficiently shown in his performance at the general certificate examination, and the decisions now to be taken will in very many cases be simple and straightforward. In actual fact we have been giving vocational guidance all along, and this is only the final refinement of the process. It will be seen, therefore, that instead of having to apply to a large number of pupils an elaborate vocational guidance technique at the final stage (fifteen or sixteen), as we should have to do under the usual school conditions, we have now to apply a vocational *selection* procedure only to a limited number. Not only is the whole process much shorter, it is also much simpler. Consider each category separately:

(1) A pupils. These will easily reach a general certificate standard in three years and their fourth year will be devoted to the attainment of an 'honours' standard in their main subjects, and in any subsequent special preparation for the entrance examinations of the profession they wish to enter. The vocational adviser has no very serious problem, except where the special abilities of the pupil and those required in the occupation do not correspond.

(2) B pupils. These will probably fall into two groups—those who wish to emulate the A pupils and prepare for professions, and those who will be content with a general certificate in order to prepare specially for clerical work in offices, etc., or for an apprenticeship. Again, no very serious problem arises, though there is greater scope for disagreement between the pupil's choice and the adviser's opinion based on his record.

(3) C pupils. A few will have ambitions that are perhaps too high, but it may be that a more generous interpretation of the requirements of occupations will open doors which have hitherto been closed to many of these pupils. If the 'all-round' hurdle be replaced by a 'special ability' one, even at a higher standard, some of these pupils would achieve their ambition where at present they fail. But most of them will be satisfied to obtain a pass in the general certificate, and to let this represent the extent of their interest in education 'for its own sake.' They will wish, now, at fifteen, to concentrate on preparing

for the occupation of their choice. And here we encounter a much longer list of occupations, in many of which highly specialised abilities are required. To the adviser the problem thus becomes one of selection—selecting the pupil for a specialised course of instruction; but to the child it is still a problem of choice, and the adviser now faces his most difficult task.

He would be quite unable to deal with it under existing conditions of school organisation. The usual record of a fifteen-year-old pupil shows little positive connection with occupations such as plumbing, painting and the like, and the normal procedure of most boys and girls entering manual occupations at this age is to trust to luck. Curricula organised as we have indicated will help, because they provide means of concentrating the pupils' abilities in one or two main directions. Nevertheless, the adviser will often be in a dilemma unless he can obtain supplementary information derived from special measures.

This, then, is the stage at which such measures should be applied. When a boy of fifteen, of average or less than average ability, says he wants to be a joiner or a mechanic, the adviser's task is to say whether or not the boy can achieve this particular ambition, and if he thinks he can, to admit him to the group receiving such special instruction. The decision should be based upon a definite criterion of suitability, which will, naturally, vary from one occupation to another, and which, as already pointed out, should be decided in consultation with the principal employers in each occupation.

Thus, the prospective joiner might be required to show that he had ability to use wood-working tools, to make wooden articles, to draw to scale and to interpret scale drawings, to show competence in practical mensuration. The basic abilities involved in all these activities were being employed in the constructive or mathematical activities of the earlier stage, and it should not be difficult to measure them. But, in case of doubt, specific tests of form perception and manual skill could be applied at fifteen.

Similarly, the prospective mechanic might be required to prove that he had ability to use metal-working tools, to make metal articles, to draw to scale and to interpret scale drawings, to understand machines and the principles of elementary mechanics. These, too, might have been displayed in previous school work, but there could be, in addition, tests of mechanical aptitude, including tests of form perception, repetitive assembling, knowledge of mechanisms and the like.

There are not, at the present time, any ready-made examinations of this kind, though there are numerous activities which might be so employed. Procedures, similar in intention though different in method, have been used in Birmingham and elsewhere for the selection of pupils for admission to junior technical schools at the age of twelve or thirteen. But there appears to have been some disappointment with the results which has tended to bring the type of examination into discredit. This is to be regretted, because the methods and the tests have been proved in many investigations. It may be that discrepancies occur because tests of highly specific abilities are being employed at an age when the consistency of the results is likely to be at its lowest. If we are to take the Fife and other data as our guide, we shall conclude that fifteen is soon enough for this particular type of selection.

It follows, then, that organised inquiries will be necessary for the further elucidation of these problems. But inasmuch as the school organisation described in these pages would produce a group of pupils whose responses to special-ability tests would probably differ considerably from those of pupils in schools today, such investigation will have to wait until appropriate conditions for its application have arrived.

Meanwhile, the general outline of our problem is quite clear, and although the means and methods of solving it must vary from place to place and from one set of conditions to another, enough has been said to indicate what the characteristics of the best possible solution are likely to be. The material for the framework already exists; it has only to be assembled. The pieces of fabric required to cover the skeleton have yet to be cut out, shaped and sewn together, but with some anticipatory study and investigation these could be ready for the time when they will be needed.

It will be appreciated that a unified and comprehensive organisation such as we have been considering, covering pupils of all types of ability and vocational ambition, can only be realised if the school age is raised to sixteen. In Scotland, in 1939, when it was expected that the school-leaving age would become fifteen, the ways in which the additional year might be effectively used were not clearly perceived. It was seen that development might take various forms, some along the lines described here; but it was also realised that if, through exemptions, fifteen were to mean fourteen plus, the final result would be worse than the first. The necessary change of attitude by parents and pupils will not come—if, indeed it ever does come—through compromise legislation which satisfies no one. Yet, without such a change of attitude, no raising of the school age will achieve any of the results that will be expected. There seems to be more prospect of securing it by making the school age sixteen than by temporising with fifteen. That there are, and will be, serious administrative difficulties is obvious, but they must be overcome. In Scotland there exists in the multilateral school a basic organisation which could comparatively easily be adapted to the new needs; and though it might not be considered the most suitable type of school for all areas and for all conditions, it could at least contribute useful experience to the solution of these problems.

The reconstruction of the secondary school cannot, in any case, be easy. Many buildings are out of date. Those on congested city sites cannot be enlarged. The academic secondary schools are not equipped for specialised vocational instruction. Centralisation brings its own peculiar problems of selection. Teachers will require a different training and a fresh approach to secondary-school work. All this will take time, probably a long time. Meanwhile, pending appropriate legislative and administrative activity, those who will eventually have to put the new ideas into practical application must study their problem and be ready with their solution. In so far as joint research and inquiry are needed, these should be already in progress. If it could be plainly demonstrated what the practical procedures of the secondary schools would become when the school age is raised, perhaps opposition to the project would be substantially diminished.

It may be that large numbers of new secondary schools will have to be built to provide for greatly enlarged school populations. If so, they should not be placed on town or city sites of restricted area; instead, they should be built, wherever possible, on the outskirts, with ample room for playing-fields, gardens and such necessary extensions as can reasonably be anticipated by wise planning. Transport outwards may be slightly more costly than transport inwards, but it is bound to be worth-while expenditure. Existing buildings on central sites would not be wasted because they could be adapted for the purposes of adult education, youth clubs, and even specialised vocational training where this is centralised.

Buildings on an open site would not have to be of the many-storied type characteristic of congested city sites, and need not be of such permanent character that they become obsolete long before the condition of the fabric justifies demolition. The only building that need be permanent in this sense is the main hall, which should form the centre of the school community life. All other buildings should be capable of extension, rearrangement or removal as the needs of the school require. They might be planned in self-contained units of varying sizes, readily adaptable to varying requirements, which could be arranged and rearranged at will. Prefabrication is being applied in many directions, and it might be successfully applied to the school-building problem. Present-day buildings are not sufficiently 'adjustable'; most science laboratories, for example, are unsuited for any other purpose, 'lecture' rooms are not easily convertible into 'class' rooms or 'work' rooms. Fixed furniture and fittings are often too heavy, too large or clumsy for alternative uses. Yet, in a school where the needs of the pupils are constantly changing, flexibility of organisation, as regards curricula, etc., implies a corresponding flexibility in rooms and equipment. If the demand for instruction in, say, technical drawing were to increase in one year while that, say, for biology decreased, it ought to be possible to adapt for some other purpose the room previously used for biology and to restore it again when the situation required it.

Again, suggestions have been made for introducing day secondary-school pupils to the conditions of boarding-school life. Some of the benefits of this procedure could be obtained more simply by establishing the new secondary school in such surroundings that it could be organised as a sort of day boarding school, in which the pupils could spend the whole of the 'working' day. If, in addition, either nearby or in some suitable country place, there was a permanent school camp which the pupils could visit in rotation, either in 'houses' or in 'clubs,' at appropriate intervals, a good many of the experiences and influences enjoyed by boarding-school pupils could be made accessible to day-school pupils at comparatively small cost.

Considerations of this kind tend, however, to lead our creative imagination into the paths of the 'ideal' rather than of the practicable and possible. But unless we have an ideal to strive for and the ability to give it concrete expression, progress will be slow. None of the suggestions we have so far considered can, however, be regarded as idealistic and therefore impossible of achievement. If they were deemed worthwhile by the majority of those *on whom the practical tasks would fall,* most of these 'dreams' could be realised within a decade.

APPENDIX I

TESTS OF ABILITY FOR SECONDARY-SCHOOL COURSES

TEN or eleven years ago the Scottish Council for Research in Education sponsored an investigation into Tests of Ability for Secondary-school Courses and a report was published in 1936. The tests were four in number:

Test of Ability in the Use of Words.
Test of Ability for Science.
Test of Ability for Algebra.
Test of Ability for Geometry.

They were devised for use with pupils just commencing a secondary course, in the hope that they might help the school administrator to differentiate between those who would probably achieve a satisfactory standard of attainment in subjects cognate to the tests and those who would be unlikely to reach the same standards.

The accumulated data now reported come from schools in Scotland and England. The groups for each Scottish school and for each year have been examined separately, but the corresponding school groups in England were so small that, for convenience, the results have been combined. It is a noteworthy feature of the data as a whole that the results from school to school and from year to year show a high degree of similarity.

The ages of the children examined were found to lie between the extreme limits of ten years and thirteen years, but there were few near these limits. The mean age for children attending English schools was 11 years 7 months (S.D. 7·5 months), whereas for children attending Scottish schools it was 12 years 2 months (S.D. 6 months).

When the score distributions of age groups differing by 3 months were examined, it was found that increase in score with age was slight; in fact, in the Scottish schools there is a decrease in score. The correlation, for example, between the score in the Words Test, and age ($n = 235$) was ·05 ± ·45, while the corresponding figures for the Algebra Test were $-$·024 ± ·045. This implies that when the procedure of selection for secondary-school courses (whether it be based upon mental age or upon scholastic attainment or both) has produced a reasonably homogeneous group, the scores obtained in these tests by individuals are not affected to any appreciable extent by influences attributed chiefly to age (or *duration* of experience). Individual scores seem to be determined by abilities (innate and acquired) which are significant, not only in regard to the level of attainment already reached, but also in regard to that likely to be attained in the future; for when these tests are given to pupils *rejected* by the ordinary procedure of selection for secondary schools the rejections are, in the large majority of cases, confirmed. Yet age is not always negligible; if the selection procedure is faulty, resulting in groups not so homogeneously constituted, the correlation with age will tend to increase.

The criterion of ability adopted throughout this analysis is a 'pass' at the School Certificate Examination or, in the case of pupils not actually presented for examination, a standard of attainment equivalent thereto. In Scotland, Certificates are awarded at two stages, viz, the completion of a three years' course and the completion of a five years' course. Owing to the large wastage (disclosed in the tables), the main analyses for Scottish pupils refer to the standard of attainment expected for the Junior Certificate (three years); those for the Senior Certificate (five or six years) are supplementary. The corresponding examination standard for pupils attending English schools is that of the School Certificate (four years).

In reading the tables the headings and abbreviations should be interpreted thus:

'Certificate Pupils' means those who *began* a course of study for a Certificate. This usually means a course which includes one modern foreign language, but the Scottish groups also include some boys (technical) and girls (commercial) who did not study a language.

Unf. (Unfinished) means that the child left school to enter employment before the Certificate course was completed, and it is used only when dealing with 'Certificate pupils.' With most of these pupils, and especially with those who leave shortly before the completion of the course, it is possible to distinguish between those who were failing to make adequate progress (F) and those who might reasonably have been expected to pass if they had completed the course (P). It is apparent in numerous cases, but not in all, that awareness of inability to pass is a factor in the decision to leave school.

'Other pupils' means those who intended to leave school at the statutory leaving date and who could not be induced to attempt the longer courses even when apparently able enough to do so.

P (pass) means that the child equalled or surpassed the standard of attainment required at the particular stage under consideration.

F (fail) means that the child did not reach this particular standard in the *subject* under consideration, even though he may have gained a certificate for his work in the examination as a whole.

It should also be noted, in comparing the Scottish Certificate results with the English Certificate results, that the *selection* of the latter pupils was probably on a higher ability standard than the former, even though their lower average age is associated with a slightly lower set of scores.

TABLE I

Ability for English. Certificate Pupils

	Junior Certificate, Scotland															*School Certificate, England*			
																Lang.		*Lit.*	
Year of Test . .	*1934*		*1935*		*1936*		*1937*		*1938*		*1939*		*Totals*		*Probability of Error in forecasting a Pass*	*1937*		*1937*	
Year of Examination .	*1937*		*1938*		*1939*		*1940*		*1941*		*1942*					*1941*		*1941*	
Result . . .	*P.*	*F.*	*P.*	*F.*	*P.*	*F.*	*P.*	*F.*	*P.*	*F.*	*P.*	*F*	*P.*	*F*		*P.*	*F.*	*P.*	*F.*
Score in test.																			
120 and over .	47	0	32	0	25	0	23	0	24	0	25	1	176	1	remote	36	0	32	2
106 to 119 . .	31	1	30	3	28	3	24	1	24	1	18	0	155	9	17 to 1 against	62	1	50	13
91 to 105 . .	24	5	26	2	40	4	23	5	24	3	27	4	164	23	7 to 1 ,,	94	13	64	34
86 to 90 . .	5	1	5	1	3	3	8	1	11	1	11	1	43	8	5½ to 1 ,,	26	5	23	11
76 to 85 . .	9	4	3	3	6	5	9	7	3	3	5	2	35	24	1½ to 1 ,,	24	13	24	15
Under 76 . .	0	2	1	1	1	8	1	6	0	5	2	9	5	31	1 to 6 ,,	17	21	18	25
Totals . . .	116	13	97	10	103	23	88	20	86	13	88	17	578	96		259	53	211	100
Percentage (approx.)	90	10	91	9	82	18	81	19	86	14	84	16	86	14		83	17		
Number of forecasts	129		107		126		108		99		105		674			312			
Errors of forecasts (90)[1]	14	6	9	5	10	7	18	6	14	4	18	5	116 (17 per cent.)			67	14		
Errors of forecasts (85)	9	7	4	7	7	10	10	7	5	3	7	6				41	19		
Minimum error totals (85) . . .	16		11		17		17		8		13		82 (12 per cent.)			60			
Minimum error totals (76) . .	11		10		16		15		8		10		70			49			
Minimum percentage error . .	8·5		9·3		12·7		13·9		8·1		9·5		av. 10·4			15·7			

The last column shows the corresponding figures for English Literature. The test has not the same prognostic value for English Literature as it has for English Language.

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[1] Draw a line to separate the scores over 90 from scores of 90 or less. The number of errors is the total below this line in the Pass column plus the total above this line in the Fail column. Similarly for any other dividing line.

TABLE II

Ability for English (*a*) Unfinished Courses (Certificate Pupils) and (*b*) Others

Scotland

Year of Test	*1934*			*1935*			*1936*			*1937*			*1938*			*1939*			*Totals*		
Result	(*a*) *P.*	*Unf. F.*	(*b*) *F.*	(*a*) *P.*	*Unf. F.*	(*b*) *F.*	(*a*) *P.*	*Unf. F.*	(*b*) *F.*	(*a*) *P.*	*Unf. F.*	(*b*) *F.*	(*a*) *P.*	*Unf. F.*	(*b*) *F.*	(*a*) *P.*	*Unf. F.*	(*b*) *F.*	(*a*) *P.*	*Unf. F.*	(*b*) *F.*
Score in test:																					
120 and over	5	1	—	9	2	—	4	1	1	0	0	1	4	0	1	12	1	0	34	5	3
106 to 119	12	2	—	9	3	—	14	1	7	10	3	8	18	2	4	9	4	5	72	15	24
91 to 105	17	7	—	11	3	—	5	5	25	14	6	16	31	10	18	12	9	28	90	40	87
86 to 90	4	2	—	2	2	—	1	2	12	8	3	25	9	10	15	7	3	11	31	22	63
76 to 85	1	7	—	1	6	—	1	2	41	0	9	30	0	10	40	4	8	42	7	42	153
Under 76	0	3	—	0	5	—	0	1	69	0	16	82	0	13	77	2	12	76	2	50	304
Totals	39	22	—	32	21	—	25	12	155	32	37	162	62	45	155	46	37	162	236	174	634
Percentages	64	36	—	60	40	—	67	33	—	48	52	—	58	42	—	56	44	—	58	42	—
" Unf " as percentage of total " Certificate "		32·1			33·1			22·7			38·9			51·9			44·1				
Minimum error of forecast (85)		21·3			20 8			27·0			17 4			20·6			27·7				

1. *Test of Ability in the Use of Words*

Table I shows, for Certificate pupils only, the relation between the child's score in the test and his proficiency in English at the Junior Certificate Examination (Scotland) or the School Certificate Examination (England). In the former, the mark in English is a general one based upon work in both Language and Literature; in the latter there are two separate examinations and the results are given separately. The Scottish figures refer to *six different years in one school* and the English figures to *ten different schools in one year*.

It will be observed that the possibility that a child who scores 120 or more in the Words Test will fail to reach the required standard in English is exceedingly remote, and that the vast majority of those who score more than 90 pass the examination (32 out of 528 fail in Scotland, 14 out of 206 in England). Among pupils who completed Certificate courses the significance of a score between 91 and 105 is practically the same both in Scotland and in England, viz., only one pupil in every eight is a probable fail.

Below 91 the probability of a fail rapidly increases. There are the 'borderline' cases between 86 and 90 where the probability of a pass is greater than the probability of a fail; but below 86 it becomes safer to expect a 'fail' than to forecast a 'pass.' Yet, as will be explained presently, the error in forecast implied by these figures can be reduced by suitable measures.

Table II shows the corresponding data for (*a*) pupils whose Certificate courses were unfinished and (*b*) for those who never began a Certificate course. In the former case, the probability of a 'pass' is much reduced throughout the whole range of scores; in the latter, since Certificate work is not attempted, they are all classified as 'fail,' though according to the scores the *possibility* of reaching a pass standard seems to have existed in about 20 per cent. of the cases. This 'possibility' is, however, more apparent than real, because the incentives to progress which form the background to the work and ability of the Certificate pupils are lacking. And this same lack of incentive is without doubt one of several disturbing factors among those Certificate pupils who do not complete their studies. The administrator dealing with a group of unknown children would therefore be more liable to error if he attempted to classify them *by test scores alone*. The extent of this error is shown in Table III, in which the errors of forecast for all the children tested, for the four years 1936 to 1939, are combined. The probability of a 'pass' within the score range 86 to 105 is approximately 'evens,' so that the errors will be the same whether the pupils be regarded as prospective 'passes' or prospective 'fails.' The probability that a score below 86 represents a real lack of ability is, however, very much increased. The combining of the cases in Table III gives as near an approximation to an *unselected* group as it has been possible to get with the data available. But it contains too high a proportion of children of high ability and too small a proportion of children of low ability. Over all, the minimum percentage error is 20, that is, one error in every five forecasts.

Before considering these points in further detail, some attention must be given to the general consistency of the data from year to year, and especially to the standards of examination used as the criterion. (This point does not arise, of course, in connection with the data from England.)

The percentage of 'certificate pupils' who failed from year to year is shown in Tables I and II. There was a distinct increase in this number in the examination years 1939, 1940, while a decrease in the last two years has not brought it back to what it was in 1937, 1938. But this has certainly not been due to a raising of the examination standards; on the contrary, the removal in 1939 of the external control previously exercised by the Scottish Education Department might have been expected to produce an opposite effect. The differences seem more likely to be a sign that disturbing influences have been operating since 1939, for they are proportionately larger in the case of those who left before the completion of the course.

The number of these unfinished courses greatly increased during the later years, namely from 37 out of 163 in 1939 (22·7 per cent.) to 107 out of 206 in 1941 (51·9 per cent.). This is readily explained by the increased demand by local employers for young people of all types. The need for completing a Certificate course seems less urgent than the employer's need for someone—however young—to fill the gap in his staff. The effect of a constant trickle of 'leavers' upon the work of those who remain is bound to be cumulative. The incentive to work for a certificate is reduced and the effect of other competing interests becomes stronger. The work of the whole group tends to suffer, and lower marks, in their turn, induce some parents to accelerate the withdrawal of their child from school.

These factors in the general school environment deserve mention because any considerable variations in the examination standards or results from year to year would reduce the prognostic value of the test. The fact that the data of Table I show a satisfactory consistency at all the score levels may reasonably be taken to mean that the test presents to the children entering the secondary school a problem of constant difficulty, and also that their responses to it are associated, to a similar degree of consistency, with the quality of their work at more advanced stages.

When this test was published in 1936 it was thought that 90 could be taken as a satisfactory 'critical score,' i.e. as the score which would best separate a potential 'pass' from a potential 'fail.' It will be seen from Table III that for this mixed group this figure is correct. But in the case of pupils selected for a secondary course whose intention to complete the course remained unchanged by circumstances, Table I shows that the smallest number of errors

TABLE III

Ability for English. Errors of Forecast (Cases Combined)

Year of Test	*1936*		*1937*		*1938*		*1939*		*Totals*		*All*	*Probability of Error in forecasting a Pass*
Result	*P.*	*F.*	*P.*	*F.*	*P.*	*F.*	*P.*	*F.*	*P.*	*F.*		
Score in test:												
120 and over	29	2	23	1	28	1	37	2	117	6	123	20 to 1 against
106 to 119	42	11	34	12	42	7	27	9	145	39	184	4 to 1 against
91 to 105	45	34	37	27	55	31	39	41	176	133	309	1¼ to 1 against
86 to 90	4	17	16	29	20	26	18	15	58	87	372	1 to 1½ against
76 to 85	7	48	9	46	3	53	9	52	28	199		1 to 7 against
Under 76	1	78	1	104	0	95	4	97	6	374	380	1 to 60 against
Totals	128	190	120	219	148	213	134	216	530	838	1,278	
Number of forecasts	318		339		361		350		1,368			
Minimum error totals (90)	12	47	26	40	23	39	31	52	90	178		
Minimum error totals	59		62		62		83		268			
Minimum percentage error	18·5		19·4		17·1		23·7		18·8			

would have been made if 75 were taken as the 'critical score.' The average number of errors over the six years would have been only 10 per cent. of the number of forecasts.

It will be apparent from a comparison of the data given in Tables I, II and III that the accuracy of a forecast of proficiency in English based upon the score obtained in this test will be greatly increased if supplementary information is available. A low score with one pupil means a certain fail, with another it suggests the *possibility* of a pass. Table III represents the case when nothing is known about any of the pupils; when we should make from 17 to 23 errors in every 100 forecasts. The mistakes would be of three distinct kinds:

(*a*) Those 'Certificate pupils' whose apparent *ability* as shown by a high score in the test is a 'fluke' (copying cannot be altogether excluded). The error can be detected either by using a second or a third test under as strict conditions as possible, or by comparison with the child's previous record of achievement when available. If, however, the high score is genuine, failure in school may result from the disturbing influences mentioned above or from temperamental or other factors. Table I shows that the number of such failures is less than 5 per cent. (47 in 986) in the case of those who complete a Certificate course, whereas Table II shows that it is nearly 15 per cent. (60 in 410) in the case of those who begin but do not complete a Certificate course. There is clearly a close connection between the disturbing influences which lead to loss of efficiency and those which lead to a shortening of school life.

In normal circumstances the administrator does not know whether the child who professes an intention to complete a course will, in fact, do so; but if the information available from other sources suggests that disturbing influences are likely to arise, his judgments can be qualified accordingly.

(*b*) Those 'Certificate pupils' whose apparent *inability* as shown by a low score in the test is contradicted by the marks subsequently obtained. When the low score is 'unjust' (by accident or otherwise), the remedy again lies in repeated testing. But if the low scorers in the test were frequently to succeed in their examinations, prognosis based on a low score would be very unreliable. Tables I and II show that the number of such cases is larger (approx. 15 per cent.) for those who complete the course than for those who do not (9.7 per cent.).

The reasonable interpretation of these differences is that the significance of any particular score (as shown in the probabilities listed in Tables I and III) is conditioned by the *attitudes* as well as by the abilities of those from whom these data have been derived. Accordingly, pupils with a determination to complete the course, encouraged also perhaps by a sequence of good marks in the early stages, may succeed through perseverance and hard work. Pupils without such a determination are more likely to remain at a level

TABLE IV

Ability for English. Senior Certificate Pupils

Year of Test . . *Year of Examination*	*1934* *1939*		*1935* *1940*		*1936* *1941*		*1937* *1942*		*Totals*		*Probability of Error in forecasting a Pass*
Result . . .	*P.*	*F.*	*P.*	*F.*	*P.*	*F.*	*P.*	*F.*	*P.*	*F.*	
Score in test:											
120 and over .	18 (1)	0	13	0	10	0	13	0	54	0	92 to 1 against
106 to 119 . .	9 (4)	0	13 (1)	0	9 (2)	1	7	0	38	1	
91 to 105 . .	2 (1)	2 (2)	10 (1)	0	5 (2)	1 (1)	7	1	24	4	6 to 1 ,,
Below 91 . .	0	3 (1)	1 (1)	2 (2)	2 (1)	0	3	2	6	7	1 to 1 ,,

The figures in brackets indicate those who took the examination after six years.

of achievement more in accord with what the test scores indicate. Therefore, if we can learn to distinguish these types of pupil on admission to the secondary school, the validity of our interpretation of a low score in the test can be considerably strengthened.

(*c*) Those 'other pupils' whose apparent ability disclosed by the test never finds expression because of wrong aims and ambitions. Although in Table II they are all classified as 'Fail,' those with scores over 90 are not strictly errors of prognosis. It was known from the outset that such pupils would not reach a Certificate standard. But it does not follow that if these same pupils had been persuaded to undertake a Certificate course a satisfactory proportion of them would have passed In the light of the data of Table II the probability is that the same 'disturbing' factors which prevented so many of the 'Certificate pupils' from completing their courses (410 in 1,084 or 38 per cent) would have operated even more strongly with the pupils of this group. Unless we can remove or reduce the contrary influences in the child's environment, his declared aims and ambitions are likely to be a useful supplement to the test scores in forecasting school success

No single test can be expected to give 100 per cent. accuracy, but the above data support the opinion that this particular test can serve a useful purpose in school administration Its value will, however, be much improved if it is used with skill and discretion, and preferably in conjunction with other measures or sources of information.

TABLE V

ABILITY FOR ENGLISH. CERTIFICATE PUPILS (TWO YEARS)

School	*No of Pupils*	*Agreement*		*Errors Score over 90 and Fail Score under 90 and Pass*	*Percentage Error*
		Score over 90 and Pass	*Score under 90 and Fail*		
A	49	24	18	7	14
B	59	25	21	13	22
C	47	37	3	7	15
D	13	11	0	2	13
E	37	23	7	7	19
F	23	14	5	4	17
Totals	228	134	54	40 (4 + 36)	17
1936 Group (see Table I)	143	99	25	11 + 8	13

The large number of errors (36) among those who score 90 or less may be due to the same influences as were discussed above.

This estimate of its validity is confirmed by Table IV, which reports the results at the Senior Leaving Certificate stage (five or six years), though the number of cases to be reported is much reduced.

Taking 90 as the critical score, the number of errors in forecasting a pass is 5 and in forecasting a fail 6, a total of 11, or 9 per cent., appreciably less than that shown in Table I for the same critical score. The above remarks regarding the intention to complete the course apply with equal force to these data, but it has not been possible to give an analysis of the uncompleted courses.

Supplementary data from six other schools in Scotland for the 1936–1938 group are given in Table V. The criterion is a 'pass' in the school work at the end of two years.

2. *Test of Ability for Science*

This test was not ready for use until 1935, nor was it applied to all the pupils admitted in each year. The data to be analysed are, therefore, less in amount than with the Words Test. The criterion of ability at the Junior Certificate stage presents no serious difficulty in Scotland, since the course is a general one and is more or less common to all the pupils who take Science. At the Senior Certificate and at the School Certificate (England), however, apart from the differentiation of courses as between Physics, Chemistry and Biology, the fact that Science is not taken by all pupils creates difficulties of follow-up. The number of cases becomes very small at the final stages under consideration.

Tables VI and VII show the accumulated data for General Science in the same form as that used for the Words Test. The consistency of the data from year to year is on the whole similar to that obtained for the Words Test, but the significance of any particular score is not nearly so high. Prognosis of success in Science on the basis of the test score alone is apparently liable to considerable error. In dealing with Certificate pupils a high score in the test (i.e. a score of over 120) could be used to give a reasonably good forecast (one error in every nine cases), but a low score could not be. With 'other pupils,' however, we could forecast a fail with only 7 per cent. of error (35 in 528, Table VII, last column).

Although this result is not quite what was hoped, it is certainly not very different from what might be expected, considering how the difficulty of the subject-matter in Science varies from term to term and what different mental processes are employed. In some aspects of the work the emphasis is on memory, in others on reasoning and in others on calculation. This test of ability for Science employs several of the same mental processes,[1] but unless the marks awarded in Science are influenced by them to a similar extent we cannot expect close agreement between the two measures.

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[1] Cf Chapter VI

TABLE VI

ABILITY FOR GENERAL SCIENCE. CERTIFICATE PUPILS

	Junior Certificate												*Probability of Error in forecasting Pass*	*School Certificate*	
Year of Test *Year of Examination*	*1935* *1938*		*1936* *1939*		*1937* *1940*		*1938* *1941*		*1939* *1942*		*Totals*			*1937* *1941*	
Result	*P.*	*F.*	*P.*	*F.*	*P.*	*F.*	*P.*	*F.*	*P.*	*F.*	*P.*	*F.*		*P.*	*F.*
Score in test:															
120 and over	41	2	53	5	35	6	36	6	22	4	187	23	8 to 1 against	23	3
105 to 119	17	0	14	9	14	7	16	7	18	9	79	32	2½ to 1 ,,	11	6
95 to 104	10	3	1	5	4	6	7	5	10	6	32	25 }	1 to 1 ,,	{ 3	2
Below 95	6	1	7	8	4	6	1	7	17	18	35	40 }		{ 3	5
Totals	74	6	75	27	57	25	60	25	67	37	333	120		40	16
Percentage of fails	7·5		26·4		30·5		29·4		35·5		26·5			28·5	

TABLE VII

ABILITY FOR GENERAL SCIENCE. UNFINISHED COURSES

Year of Test	*1935*			*1936*			*1937*			*1938*			*1939*			*Totals*		
	(*a*)		(*b*)	(*a*)		(*b*)	(*a*)		(*b*)	(*a*)		(*b*)	(*a*)		(*b*)	(*a*)		(*b*)
Result	*P.*	*F.*	*F.*	*P.*	*F.*	*F.*	*P.*	*F.*	*F.*	*P.*	*F.*	*F.*	*P.*	*F.*	*F.*	*P.*	*F.*	*F.*
Score in test:																		
120 and over	3	2	—	6	3	8	4	7	9	15	6	6	0	2	12	28	20	35
105 to 119	1	10	—	2	5	13	18	3	23	9	11	22	1	1	12	31	30	70
95 to 104	0	5	—	1	0	21	1	7	23	7	5	15	0	1	16	9	18	75
Below 95	0	13	—	0	12	67	0	20	105	2	23	98	4	13	78	6	81	348
Totals	4	30		9	20	109	23	37	160	33	45	141	5	17	118	74	149	528
Percentage of fails		89			69			62			58			77			67	

Apart from this aspect of the problem, however, the validation of a test presents difficulties when the subject is not compulsory and when the motives for its study, as well as the interest in its different parts, vary so much as they do.

A similar limitation in the prognostic value of the test is seen in Table VIII (Senior Certificate pupils), which shows that the various processes of elimination have so reduced the students of Science that only the fittest have survived.

TABLE VIII

Ability for Science. Certificate Pupils

	Senior Certificate, Scotland								*School Certificate, England*					
Year of Test .	*1935*		*1936*		*1937*		*Totals*		*1937*		*1937*		*1937*	
Year of Exam. .	*1940*		*1941*		*1942*				*Chem.*		*Phys.*		*Biol.*	
Result . .	*P.*	*F.*	*P.*	*F.*	*P.*	*F.*	*P.*	*F.*	*P.*	*F.*	*P.*	*F.*	*P.*	*F.*
120 and over	10	1	11	1	10	0	31	2	27	16	50	13	16	1
105 to 119 .	2	0	1	0	2	1	5	1	15	9	17	7	5	4
95 to 104 .	0	0	1	0	0	0	1	0	1	1	2	0	5	4
Below 95 .	1	0	2	0	1	0	4	0	0	9	6	2	7	6
Totals . .	13	1	15	1	13	1	41	3	43	35	75	22	33	15

Taking the 'critical score' at 104, the errors of forecast would have been 8 out of 44 (or approximately 18 per cent.) for the Scottish pupils, whereas for the English group it would have been: Chemistry, 32 per cent.; Physics, 29 per cent.; and Biology, 35 per cent. While these results do not establish a high validity for this test for the purposes of forecasting ability for the study of Science, it is legitimate to point out that the errors resulting from its use would not be greater than those commonly occurring in present practice. (But a careful analysis of the test itself will show how it can be improved and also how it can be used to best advantage.)

3. *Test of Ability for Algebra*

The data obtained from the use of this test are given in Tables IX, X, XI. As with the Words Test, there is no evidence of notable changes in the examination standards from year to year, though the number of fails among the Certificate pupils was lower in 1940 and 1941. The percentage of unfinished courses is approximately the same (38 per cent.), since the same pupils are involved in these comparisons as were included in Tables I and II. But the

TABLE IX

ABILITY FOR ALGEBRA. CERTIFICATE PUPILS

Junior Certificate (Scotland)

Year of Test	*1934*		*1935*		*1936*		*1937*		*1938*		*1939*		*Totals*		*Probability of Error in forecasting a Pass*
Year of Examination	*1937*		*1938*		*1939*		*1940*		*1941*		*1942*				
Result	*P.*	*F.*	*P.*	*F.*	*P.*	*F.*	*P.*	*F.*	*P.*	*F.*	*P.*	*F*	*P.*	*F.*	
Score in test:															
60 and over	22	0	27	1	31	0	12	0	32	0	21	1	145	2	72 to 1 against
51 to 59	39	5	27	3	33	4	38	1	20	1	19	4	176	18	10 to 1 „
46 to 50	16	2	14	3	9	4	17	2	11	1	8	5	75	17	5 to 1 „
41 to 45	11	12	6	3	7	12	10	2	7	5	9	8	50	42	Approx. 1 to 1
36 to 40	4	6	4	6	5	5	6	5	1	4	7	7	27	33	Approx. 1 to 1
Under 36	2	8	0	7	0	12	1	9	0	2	0	19	3	57	1 to 20 against
Totals	94	33	78	23	85	37	84	19	71	13	64	44	476	169	
Percentages	74	26	78	23	70	30	81	19	85	15	59	41	74	26	
Number of forecasts	127		101		122		103		84		108		645		
Errors of forecast (45)[1]	17	7	10	7	12	8	17	3	8	2	16	10	80	37	
Errors of forecast (40)	6	19	4	10	5	20	7	5	1	7	7	18	30	79	
Minimum errors (40)	25		14		25		12		8		25		109		
Percentage	20		14		20		12		9·5		24		17		

[1] By method described in Table I.

TABLE X

Ability for Algebra. Unfinished Courses

Year of Test	*1934 Unf.*			*1935 Unf.*			*1936 Unf.*			*1937 Unf.*			*1938 Unf.*			*1939 Unf.*			*Totals*		
Result	(*a*) P.	(*a*) F.	(*b*) F.	(*a*) P.	(*a*) F.	(*b*) F.	(*a*) P.	(*a*) F.	(*b*) F.	(*a*) P.	(*a*) F.	(*b*) F.	(*a*) P.	(*a*) F.	(*b*) F.	(*a*) P.	(*a*) F.	(*b*) F	(*a*) P.	(*a*) F.	(*b*) F.
Score in test:																					
60 and over	3	0	—	4	2	—	6	0	0	2	0	0	8	2	1	5	1	0	28	5	1
51 to 59	14	4	—	5	5	—	3	2	1	11	1	7	20	9	2	15	3	4	68	24	14
46 to 50	14	6	—	4	3	—	4	2	6	9	5	11	6	8	6	8	5	17	45	29	40
41 to 45	1	10	—	3	5	—	3	3	11	9	10	22	7	11	10	8	4	22	31	43	65
36 to 40	2	3	—	2	6	—	0	1	22	1	7	38	1	14	9	2	4	27	8	35	96
Under 36	0	6	—	0	14	—	0	11	91	1	16	81	1	11	40	2	13	77	4	71	289
Totals	34	29		18	35		16	19	131	33	39	159	43	55	68	40	30	147	184	207	505
Percentage of fails		46			65			54			54			56			43			53	
Unf. as percentage of total "Certificate"		33			34			22			41			54			40			38	
Minimum percentage error of forecast (40)		35			32			20			25			32			24			30	

percentage of failures among the unfinished courses is greater for Algebra than it is for English.

Table IX, dealing with Certificate pupils, shows that the accuracy of forecasts based upon the test scores is only slightly less than that found for the Words Test. The chance of an error for a score of over 60 is 1 in 73, and for a score under 36 it is 1 in 20. Over all, the minimum error is 17 per cent. for a critical score of 40, and 18 per cent. for a critical score of 45.

Table X, dealing with unfinished courses, shows that the over-all percentage error rises to 30 when the disturbing influences which cause children to leave school reduce the number of passes. These influences appear to have had a greater effect upon the work in Mathematics than they had upon the work in English. In view of the differences in the teaching and in the development of these subjects in school, this result could have been expected.

Table XI shows that the inclusion of the 'other pupils' slightly reduces the over-all percentage error for a critical score of 45 from 18 (Table IX) to 17. Hence the real significance of a low score is greater than the figures in Table IX would suggest.

No comparisons for the Algebra Test alone are given for schools in England, because the marks supplied by these schools were in the form of Algebra and Geometry totals. (Comparisons based upon combined scores in Algebra and Geometry tests are given on page 184). Similarly the analysis of the data for pupils who completed a Senior Leaving Certificate is given in relation to both tests taken together (page 185).

Table XII gives data from the six other schools in Scotland referred to in connection with Table V (Words Test).

4. *Test of Ability for Geometry*

This test was not fully developed until 1936 and only four years' data are reported in Tables XII and XIII. The results are to some extent affected by the fact that pupils taking Commerical courses could omit Geometry. The cases in which the subject was omitted or dropped are included for comparison, but no special significance can be attached to them.

Table XII gives the data for completed courses, Table XIII the corresponding data for unfinished courses, while Table XIV gives the errors of forecast for the combined groups. In spite of obvious differences between the subject-matter of the test and the work upon which school marks in Geometry are usually awarded, the results compare not unfavourably with those obtained with the Algebra Test and the Words Test. For the Certificate pupils (Table XII) the average error (20 per cent.) is only slightly larger than it is in Algebra (17 per cent.—Table IX), but the errors for any particular score are more numerous. In this test no forecast based on score has the certainty which attaches to some of the scores in Algebra. The effect of combining all cases is not, however,

TABLE XI

ERRORS OF FORECAST (CASES COMBINED)

Year of Test . *Result .*	*1936* *P.*	*F.*	*1937* *P.*	*F.*	*1938* *P.*	*F.*	*1939* *P.*	*F.*	*Totals* *P.*	*F.*	*Probability of Error in forecasting a Pass*
Score in test:											
60 and over	37	0	14	0	40	3	26	2	117	5	23 to 1 against
51 to 59 .	36	7	49	9	40	12	34	11	159	39	4 to 1 „
46 to 50 .	13	12	26	18	17	15	16	27	72	72	1 to 1 „
41 to 45 .	10	26	19	34	14	26	17	34	60	120	1 to 2 „
36 to 40 .	5	28	7	50	2	27	9	35	23	140	1 to 6 „
Under 36 .	0	114	2	106	1	53	2	109	5	382	1 to 76 „
Totals . .	101	187	117	217	114	136	104	218	436	758	
Number of forecasts .	288		334		250		322		1194		
Minimum error (45) . .	15	19	28	27	17	30	28	40	88	116	
Minimum error totals .	34		55		47		68		204		
Minimum percentage error	11·8		16		18·8		21		17		

TABLE XII

ABILITY FOR ALGEBRA. CERTIFICATE PUPILS (TWO YEARS)

School	*No. of Pupils*	*Agreement* *Pass*	*Fail*	*Errors* *Pass Test Fail School* *Fail Test Pass School*	*Percentage Error*
A .	49	11	32	6	12
B .	59	15	34	10	17
C .	47	25	12	10	21
D .	13	4	8	1	8
E .	37	19	11	7	19
F .	23	13	2	8	35
Totals .	228	87	99	42	18
1936 group (Table IX)	137	94	24	12 + 7	14

to increase the average error, though, as seen in the other tests also, the significance of a high score is reduced while the significance of a low one is increased.

TABLE XIII

ABILITY FOR GEOMETRY. CERTIFICATE PUPILS

Year of Test	*1936*			*1937*			*1938*			*1939*			*Totals*			*Probability of Error in forecasting a Pass*
Result	*P.*	*F.*	*Drop*	*P.*	*F.*	*Drop*	*P.*	*F.*	*Drop*	*P.*	*F.*	*Drop*	*P.*	*F.*	*Drop*	
Score in test:																
Over 80	23	2	4	14	1	0	17	1	0	24	3	4	78	7	8	11 to 1 against
65 to 80	22	4	1	19	1	0	18	1	1	17	5	6	76	11	8	7 to 1 ,,
55 to 64	6	4	5	12	3	1	12	4	7	6	6	2	36	17	15	2 to 1 ,,
45 to 54	11	4	7	11	5	4	6	5	3	6	5	2	34	19	16	2 to 1 ,,
Under 45	7	9	7	6	14	7	1	14	9	1	18	2	15	55	25	1 to 4 ,,
Totals	69	23	24	62	24	12	54	25	20	54	37	16	239	109	72	
Percentage of fails		25			28			31			40			30		
Number of forecasts		92			86			79			91			348		
Minimum errors (critical score 45)	7	14		6	10		1	11		1	19		15	54		
Minimum percentage error		22			19			14			22			20		

TABLE XIV

Ability for Geometry. Unfinished Courses

Year of Test	*1936*				*1937*				*1938*				*1939*				*Totals*			
	(*a*)	*Unf.*		(*b*)	(*a*)	*Unf.*		(*b*)	(*a*)	*Unf.*		(*b*)	(*a*)	*Unf.*		(*b*)				
Result	*P.*	*F.*	*Dr.*	*F.*	*P.*	*F.*	*Dr.*	*F.*	*P.*	*F.*	*Dr.*	*F.*	*P.*	*F.*	*Dr.*	*F.*	*P.*	*F.*	*Dr.*	*F.*
Score in test:																				
Over 80	4	1	2	2	3	2	3	1	4	1	0	0	4	1	5	0	15	5	10	3
65 to 80	5	0	1	3	0	1	4	6	8	4	8	3	2	3	6	10	15	8	19	22
55 to 64	0	7	2	12	2	1	2	8	9	4	4	7	7	6	3	21	18	18	11	48
45 to 54	0	2	2	16	4	3	6	14	3	6	10	11	1	3	4	13	8	14	22	54
Under 45	1	2	0	56	2	16	27	61	1	12	30	49	6	13	17	86	10	43	74	252
Totals	10	12	7	89	11	23	42	90	25	27	52	70	20	26	35	130	66	88	136	379
Percentage of fails		54				67				52				56				57		
Number of forecasts		22				34				52				46						
Minimum error (critical score 54)	1		8		6		4		4		9		7		10		18		31	
Minimum percentage error		40				30				25				37						

TABLE XV

Errors of Forecast (Cases Combined)

Year of Test	*1936*		*1937*		*1938*		*1939*		*Totals*		*Probability of Error in forecasting a Pass*
Result	*P.*	*F.*	*P.*	*F.*	*P.*	*F.*	*P.*	*F.*	*P.*	*F.*	
Score in test:											
Over 80	27	5	17	4	21	2	28	4	93	15	6 to 1 against
65 to 80	27	7	19	8	26	8	19	18	91	41	2¼ to 1 ,,
55 to 64	6	23	14	12	21	15	13	33	54	83	1 to 1½ ,,
45 to 54	11	22	15	22	9	22	7	21	42	87	1 to 2 ,,
Under 45	8	67	8	91	2	75	7	117	25	350	1 to 14 ,,
Totals	79	124	73	137	79	122	74	193	305	576	
Number of forecasts	203		210		201		267		881		
Minimum error (65)	25	12	37	12	32	10	27	22	121	56	
Minimum error totals	37		49		42		49		179		
Minimum percentage error	18		23		21		18		20		

Some supplementary data regarding the significance of combined scores in the Tests of Algebra and Geometry is given in Tables XVI and XVII.

TABLE XVI

Ability for Mathematics. Senior Certificate Pupils

Year of Test	*1936–1941 S.C. in Mathematics*		*1937–1942 S.C. in Mathematics*		*Totals*	
Result	*P.*	*F.*	*P.*	*F.*	*P.*	*F.*
Pass in both Algebra Test and Geometry Test	18	2	25	1	43	3
Pass in Algebra Test, fail Geometry Test	6[1]	1	1	1	7	2
Pass in Geometry Test, fail Algebra Test	1[1]	0	0	1	1	1
Fail in both tests	0	1	0	0	0	1

[1] Three borderline passes and two sixth-year passes.

It is clear that a Senior Certificate pass is only probable when a pass score is obtained in both tests.

TABLE XVII

Ability for Mathematics (Algebra and Geometry Combined). Certificate Pupils

	Junior Certificate, Scotland										*Probability of Error in forecasting a Pass*	*School Certificate, England*	
Year of Test	*1936*		*1937*		*1938*		*1939*		*Totals*			*1936*	
Result	*P.*	*F.*	*P.*	*F.*	*P.*	*F.*	*P.*	*F.*	*P.*	*F.*		*P.*	*F.*
Score in test:													
145 and over	16	0	8	0	12	0	19	0	55	0	100 to 1 against	48	1
125 to 144	21	2	19	2	17	3	17	3	74	10	6 to 1 "	70	16
100 to 124	13	12	23	3	19	6	17	9	72	30	2 to 1 "	70	44
Below 100	12	14	16	28	6	13	11	16	45	71	3 to 2 "	24	32

APPENDIX II

SUB-DIVISION OF PUPILS IN A MULTILATERAL SCHOOL

FIRST YEAR

Group Number	*Nature of Course*	*Number of Pupils and Sex*	*Range of Mental Ratio*	*Median M.R.*	*Range of Score*	*Median Score*
1	Junior or Senior Certificate course with one modern language .	36 boys	116–135	129	152–234	175
2	Do. . .	36 girls	113–135	128	136–218	178
3	Do. . .	37 boys	110–128	117	132–189	155
4	Do. . .	36 girls	108–135	115	128–190	159
5 (*a*)	Do. . .	20 boys	102–122	112	110–178	148
(*b*)	Do. . .	15 girls	104–130	112	128–194	147
6	Junior Certificate Commercial course without modern language .	38 girls	94–119	108	100–163	140
7	Do . .	31 girls	100–128	115	120–185	140
8	Junior Certificate Technical course without modern language . .	35 boys	96–119	107	99–165	125
9	Domestic bias to fourteen	42 girls	90–112	101	72–170	105
10	Do. . .	43 girls	90–115	102	70–131	116
11 (*a*)	Technical bias to fourteen	20 boys	102–130	110	110–199	149
(*b*)	Do. . .	20 boys	85–106	96	50–126	100
12	Do. . .	39 boys	88–106	100	82–149	100
13	Practical course to fourteen	26 boys	73–96	85	20–81	48

The range of score in the entrance examination and the median score are of interest only in so far as they show the relative standards of proficiency reached by these various groups in the scholastic examination used to determine fitness for admission. They are omitted from the tables for the second and third years.

SECOND YEAR

Group Number	*Nature of Course*	*No. of Pupils and Sex*	*Range of Mental Ratio*	*Median M.R.*
1	Junior or Senior Certificate course with two languages (Latin added) . . .	34 boys	106–135	124
2	Do.	39 girls	109–135	124
3 (*a*)	Junior or Senior Certificate course with one language	22 boys	106–130	115
(*b*)	Do.	21 boys	98–121	110
4	Do.	32 girls	105–135	118

Group Number	*Nature of Course*	*No of Pupils and Sex*	*Range of Mental Ratio*	*Median M.R.*
5	Junior Commercial course with modern language	15 girls	100–130	117
6	Junior Commercial course without modern language	25 girls	102–127	112
7	Do.	28 girls	102–120	111
8	Junior Technical course without modern language . . .	23 boys	94–127	105
9	Domestic bias to fourteen . . .	38 girls	86–115	96
10	Do. . . .	41 girls	87–120	103
11	Technical bias to fourteen . .	36 boys	82–122	101
12	Do.	33 boys	89–119	103
13	Practical course to fourteen . .	26 boys	73–96	85

Notes:

(*a*) Groups 1 and 2 are highly selected, though they contain a few of relatively low M.R. whose diligence and perseverance enable them to make satisfactory progress.

(*b*) Groups 3 to 8 mainly consist of pupils whose abilities are 'above average,' though it will be seen that in each group there are some 'average' ones. The proportion of average pupils is greatest in group 8, among whom probably not more than half will succeed in reaching an all-round Certificate standard.

(*c*) Groups 9 to 12 consist mainly of 'average' pupils (M.R. 92 to 108) with a median approximately 100, but the range of ability is much more extensive than in any of the other groups. The problems of instruction are correspondingly more difficult.

(*d*) Group 13 comprises pupils of such very low scholastic attainment that the range of M.R. is greater than one would expect.

THIRD YEAR

Group Number	*Nature of Course*	*No.[1] of Pupils and Sex*	*Range of Mental Ratio*	*Median M.R.*
1	Junior or Senior Certificate course (two languages)	34 boys	105–135	125
2	Do.	24 girls	106–135	127
3	Junior or Senior Certificate course (one language)	32 boys	101–135	123
4	Do.	12 girls	104–132	114
5	Junior Commercial course (one language) .	16 girls	103–135	118
6	Do. (without language) .	17 girls	102–120	114
7	Do. Do. . .	10 girls	102–120	112
8	Junior Technical course	30 boys	96–126	117
9 and 10	Domestic bias to fourteen	11 girls	100–120[2]	108
11, 12, and 13	Technical bias to fourteen . . .	5 boys	97–116	105

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[1] Numbers depleted by pupils leaving to enter employment.

[2] This particular increase in median M.R. results from the fact that only the youngest pupils in the group are likely to reach Third Year before becoming fourteen, and, score for score, the younger pupils have a higher M.R.

FOURTH YEAR

At this stage there is much more sub-division among the pupils who remain and the groupings for instruction vary with the subjects taken. The main combinations of subjects taken at the Senior Certificate are, in addition to compulsory English and Arithmetic:

1. History, Mathematics, Latin, French *or* German, Greek.
2. History, Mathematics, Latin, French *and* German.
3. History (Higher), Mathematics, Latin, French *or* German.
4. History *or* Geography, Mathematics *and* Dynamics, Physics with Chemistry *or* Engineering, French *or* German.
5. History *or* Geography, Mathematics *or* Biology, Art, French *or* German.
6. History *and* Geography, Mathematics *or* Biology, French *or* German.
7. History *and* Geography, Commercial subjects, French *or* German *or* Art.
8. History *or* Geography, Mathematics *or* Biology, French *or* German *or* Art, Domestic Science.
9. History *or* Geography, Mathematics, Physics and Chemistry, Engineering and technical subjects.
10. History *or* Geography, Mathematics, Science, Art.

All Senior Certificate candidates must take History *or* Geography on the Lower Standard at least, but they may take either or both on the Higher Standard.

Number of pupils: 51 boys, 35 girls.
Range of M.R., 105–135; Median M.R., 120.

FIFTH YEAR

The same courses continued.
Number of pupils: 26 boys, 26 girls.
Range of M.R., 107–135; Median M.R., 125.